Flood Risk Assessment

Battersea Park Road

Client:	Watkin Jones Group
Document Type:	Report
Document No.:	956-ACE-ZZ-XX-RP-C-1002
Revision:	003
Date:	January 2024

VERSION HISTORY

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Revision	Date	Notes	Prepared by	Checked by	Approved by
001	March 2022	First Draft	Keelan Serjeant	George Boden	Lee Fisher
002	April 2022	Second Draft	Keelan Serjeant	George Boden	Lee Fisher
003	January 2024	Third Draft	Keelan Serjeant	George Boden	Lee Fisher

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Executive Summary

The proposed development would be expected to remain dry in all but the most extreme conditions. Providing the recommendations made in this Flood Risk Assessment (FRA) are instigated, flood risk from all sources would be minimised, the consequences of flooding are acceptable and the development would be in accordance with the requirements of the National Planning Policy Framework (NPPF), the London Plan and the London Borough of Wandsworth Core Strategy.

This FRA demonstrates that the proposed development would be operated with minimal risk from flooding, would not increase flood risk elsewhere. The development should not therefore be precluded on the grounds of flood risk.

1. INTRODUCTION

1.1 Background

This Flood Risk Assessment (FRA) has been prepared by Apex Consulting Engineers at the request of the Watkin Jones Group for the proposed development of 41-49 (Bookers) and 49-59 (BMW) Battersea Park Road.

The application is for Phased Full Planning Permission for: Demolition of all existing buildings and construction of three new buildings, together comprising Residential (Use Class C3) and Student Accommodation (Sui Generis) along with Commercial, Business and Service (Use Class E) and/or Local Community and Learning (Class F1) floorspace. Associated works include hard and soft landscaping, car parking and new vehicular access / servicing, and other ancillary works.

This FRA has been carried out in accordance with guidance contained in the National Planning Policy Framework (NPPF)[1], associated National Planning Practice Guidance (NPPG)[2] and the NPPG 'Site-specific flood risk assessment checklist. This FRA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

It is recognised that developments which are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. The development design should be such that future users will not have difficulty obtaining insurance or mortgage finance, or in selling all or part of the development, as a result of flood risk issues.

1.2 National Planning Policy Framework (NPPF)

One of the key aims of the NPPF is to ensure that flood risk is taken into account at all stages of the planning process; to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest risk. It advises that where new development is exceptionally necessary in areas of higher risk, this should be safe, without increasing flood risk elsewhere, and where possible, reduce flood risk overall.

A risk based approach is adopted at stages of the planning process, applying a source pathway receptor model to planning and flood risk. To demonstrate this, an FRA is required and should include:

- whether a proposed development is likely to be affected by current or future flooding from all sources;

[1] Ministry for Housing, Communities and Local Government (2023) National Planning Policy Framework: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf
[2] Communities and Local Government (2022) Planning Practice Guidance - Flood Risk and Coastal Change: https://www.gov.uk/guidance/flood-risk-and-coastal-change

- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate;
- if necessary, provide the evidence to the Local Planning Authority (LPA) that the Sequential Test can be applied; and
- whether the development will be safe and pass part c) of the Exception Test if this is appropriate.

1.3 Report Structure

This FRA has the following report structure:

- Section 2 details the sources of information that have been consulted;
- Section 3 describes the location area and the existing and proposed development;
- Section 4 outlines the Sequential and Exception Tests;
- Section 5 details the flood risk to the existing and proposed development;
- Section 6 details the proposed mitigation measures used to manage and reduce the flood risk; and
- Section 7 presents a summary and conclusions.

2. SOURCES OF INFORMATION

2.1 Environment Agency

The Flood and Water Management Act 2010 gives the Environment Agency a strategic overview role for all forms of flooding and coastal erosion. They also have direct responsibility for the prevention, mitigation and remediation of flood damage for main rivers and coastal areas. The Environment Agency is the statutory consultee with regards to flood risk and planning.

Information regarding the current flood risk at the application Site, local flood defences and flood risk has been obtained from the Environment Agency including Environment Agency published 'Open Data' datasets available online, reproduced with OS mapping under licence (contains Ordnance Survey data © Crown copyright and database right [2020], contains Environment Agency information © Environment Agency and database right) (see Appendix B).

2.2 London Borough of Wandsworth

The London Borough of Wandsworth is the LPA, and the Lead Local Flood Authority (LLFA) and has responsibilities for 'local flood risk', which includes surface runoff, groundwater and ordinary watercourses. Planning guidance written by London Borough of Wandsworth regarding flood risk was consulted to assess the mitigation policies in place.

The London Borough of Wandsworth Level 1 Strategic Flood Risk Assessment (SFRA) dated December 2015, the London Borough of Wandsworth Preliminary Flood Risk Assessment (PFRA) and the London Borough of Wandsworth Surface Water Management Plan dated September 2011, which cover the Site have been reviewed.

2.3 Thames Water

Thames Water is responsible for the disposal of wastewater and supply of clean for this area. Information with regards to sewer and water main flooding contained within the London Borough of Wandsworth SFRA and the London Borough of Wandsworth PFRA have been consulted. All Water Companies have a statutory obligation to maintain a register of properties/areas which are at risk of flooding from the public sewerage system, and this is shown on the DG5 Flood Register.

2.4 Relevant Planning Policy

This FRA has been prepared in accordance with the relevant national, regional and local planning policy and statutory authority guidance as follows:

- National policy contained within the National Planning Policy Framework (NPPF) updated 2023, issued by Communities and Local Government, with reference to

- Section 14 'Meeting the challenge of climate change, flooding and coastal change';
- The Planning Practice Guidance (PPG) released in March 2014 and updated 2022 ('Flood Risk and Coastal Change' section);
- The Environment Agency 'Flood Risk Assessments: Climate Change Allowances' guidance (most recently updated 2022);
- Environment Agency regional guidance contained in the 'Thames Area Climate Change Allowances – Guidance for their use in flood risk assessments', and 'Thames Guidance Statement – Safe Access/Egress for LPAs';
- The Greater London Authority's 'The London Plan Spatial Development Strategy for London Consolidated with Alterations since 2011', with reference to SI 12 'Flood Risk Management dated March 2021;
- The Environment Agency's Thames Estuary 2100 Plan (TE2100) released in November 2012, which sets out the recommendations for flood risk management for London and the Thames estuary to the end of the century, and the subsequent TE2100 5-year review in July 2016;
- The London Plan (adopted 2021) with particular reference to Policy SI 12 Flood risk management; and
- Local planning policy contained within the Wandsworth Local Plan 2023-2038 (adopted 2023), with particular reference to LP12 Water and Flooding (Strategic Policy).

London Plan (2021)

The Mayor of London has published the London Plan (2021) and Policy SI 12 Flood risk management notes that:

"A Current and expected flood risk from all sources (as defined in paragraph 9.2.12) across London should be managed in a sustainable and cost-effective way in collaboration with the Environment Agency, the Lead Local Flood Authorities, developers and infrastructure providers.

B Development Plans should use the Mayor's Regional Flood Risk Appraisal and their Strategic Flood Risk Assessment as well as Local Flood Risk Management Strategies, where necessary, to identify areas where particular and cumulative flood risk issues exist and develop actions and policy approaches aimed at reducing these risks. Boroughs should cooperate and jointly address cross-boundary flood risk issues including with authorities outside London.

C Development proposals should ensure that flood risk is minimised and mitigated, and that residual risk is addressed. This should include, where possible, making space for water and aiming for development to be set back from the banks of watercourses.

D Developments Plans and development proposals should contribute to the delivery of the measures set out in Thames Estuary 2100 Plan. The Mayor will work with the Environment Agency and relevant local planning authorities, including authorities outside London, to safeguard an appropriate location for a new Thames Barrier.

E Development proposals for utility services should be designed to remain operational under flood conditions and buildings should be designed for quick recovery following a flood.

F Development proposals adjacent to flood defences will be required to protect the integrity of flood defences and allow access for future maintenance and upgrading. Unless exceptional circumstances are demonstrated for not doing so, development proposals should be set back from flood defences to allow for any foreseeable future maintenance and upgrades in a sustainable and cost-effective way.

G Natural flood management methods should be employed in development proposals due to their multiple benefits including increasing flood storage and creating recreational areas and habitat."

London Borough of Wandsworth Local Plan 2023-2038 (2023)

LP12 Water and Flooding (Strategic Policy) notes that:

"Flood Risk Management

A. All planning applications will need to clearly demonstrate that the proposals avoid or reduce contributing to all sources of flooding, including fluvial, tidal, surface water, groundwater, flooding from sewers; take account of climate change (including predicted future changes), and would not increase flood risk elsewhere.

B. Development will be guided to areas of lower risk, both on-site and by applying the 'Sequential Test' unless already passed under part E below, as set out in national policy guidance, and where required, the 'Exception Test'. Inappropriate developments and land uses will be refused in accordance with national policy and guidance, and the Council's Strategic Flood Risk Assessment (SFRA).

C. In flood zones 2 and 3, all planning applications (or other relevant applications) on sites of 10 or more dwellings or 1000sqm of non-residential development or more, or on any other proposal where safe access/egress cannot be achieved, a Flood Emergency Plan must be submitted.

D. Where a Flood Risk Assessment is required, applicants will be required to demonstrate that their proposal does not increase, and reduces surface water, fluvial and/or tidal flood risk elsewhere by ensuring that:

1. Any loss of fluvial flood storage within the 1 in 100 plus appropriate climate change allowance flood extent must be compensated for on a level for level, volume for volume basis. Proposals must demonstrate that fluvial flood flow routes are not impeded.

2. In undefended tidal areas there is no increase in built footprint or raising of ground levels. Where water compatible structures are acceptable, such as pontoons or slipways, they must be designed to minimise the loss of flood storage i.e. floodable, hollow structures.

3. Unless exceptional circumstances are demonstrated for not doing so, opportunities to provide additional flood storage must be considered and be designed into the development, in addition to ensuring no loss of surface water, fluvial and/or undefended tidal flood storage.

The application of Sequential Test

E. Future development in Zone 3a and Zone 2 will only be considered if the 'Sequential Test' has been applied and the Exceptions Test passed in accordance with national planning policy and guidance. For development sites falling outside of the areas below, the default area of search for the Sequential Test to be applied will be the borough administrative area, unless justification is provided for a smaller area as described in the Strategic Flood Risk Assessments. The Sequential Test is considered to have been passed, if the proposal meets one of the following criteria:

1. The application site is located within an Area Strategy area as identified in this Local Plan; including within a 400m buffer around the Town Centre based strategies:*

a. Vauxhall Nine Elms Battersea Opportunity Area (including Battersea Design and Technology quarter)

b. Roehampton Regeneration Area

c. The Wandle Valley

d. Wandsworth' s Riverside

*e. Balham**

*f. Clapham Junction and York Road/Winstanley Regeneration Area**

*g. Putney**

*h. Tooting**

*i. Wandsworth Town, including the Wandle Delta sub-area**

2. The application site is a Local Plan Site Allocation, unless the proposed use is not in accordance with the allocations of the Local Plan.

3. Redevelopment of an existing single residential property or its ancillary uses.

4. Minor development[3] , conversions and change of use (except changes of use to a caravan, camping or chalet site, or to a mobile home or park home site)."

[3] Minor development is defined in Section 1b 'Interpretation of Table' of Schedule 4 'Consultations before the grant of permission' of the Town and Country Planning (Development Management Procedure) (England) Order 2015 (The Town and Country Planning (Development Management Procedure) (England) Order 2015

The Site is identified in Wandsworths' Local Plan-Site Specific Allocations Document for mixed use development including residential, as site NE2 41-49 Nine Elms Lane, and 49-59 Battersea Park Road, SW8. As a consequence and in accordance with Policy LP12, the Site is deemed to have passed the Sequential Test.

(legislation.gov.uk)) and in Paragraph: 046 Reference ID: 7-046-20140306 of the Planning Practice Guidance (Flood risk and coastal change).

3. LOCATION & DESCRIPTION

3.1 Site Location

The Site is located at 41-49 (Bookers) and 49-59 (BMW) Battersea Park Road ("The Site") (see Drawing 956/FRA/001).

The Site is an allocated site, for mixed use development including residential, within the Wandsworth Site Specific Allocations Document 2016 as site 2.1.13 (Booker Cash and Carry, 41-49 Nine Elms Lane, SW8) and site 2.1.24 (49-59 Battersea Park Road, SW8). The Site has previously been granted planning application (ref: 2015/6813) for a mixed use development including residential uses and was approved on the 28th March 2019.

3.2 Existing Development

The Site is currently two commercial buildings occupied by a retail warehouse and a vehicle service centre (see Appendix C).

3.3 Proposed Development

The application is for Phased Full Planning Permission for: Demolition of all existing buildings and construction of three new buildings, together comprising Residential (Use Class C3) and Student Accommodation (Sui Generis) along with Commercial, Business and Service (Use Class E) and/or Local Community and Learning (Class F1) floorspace. Associated works include hard and soft landscaping, car parking and new vehicular access / servicing, and other ancillary works. The proposed Site layouts are shown in Appendix D.

3.4 Ground Levels

The Site falls slightly towards the south and east with ground levels of between 4.60 metres Above Ordnance Datum (mAOD) and 3.30mAOD. The northern portion of the Site is slightly elevated from the surrounding roads, and there is a significant difference in ground levels between the southern area of the Site, the adjacent property and road. Kirtling Street to the east of the Site drops sharply to pass under the railway. A topographical survey is included within Appendix E.

3.5 Catchment Hydrology / Drainage

The River Thames flows approximately 500m to the north of the Site and its tidal limit is situated at Teddington Weir upstream of the Site. The Site lies within the Battersea and Chelsea Reaches of the River Thames, the Site is therefore potentially at risk from both fluvial and tidal flooding from the River Thames.

Sewer records received from Thames Water indicate that there is a combined public sewer within Sleaford Street and the Heathwall Trunk sewer flows beneath the Site.

3.6 Ground Conditions

The Site is immediately underlain by superficial deposits including Alluvium over the Kempton Park Gravel Formation. The Alluvium is recorded as absent in the north western portion of the Site. The bedrock beneath the superficial deposits comprises London Clay. The Site is located on Unproductive Strata (Superficial Deposits and Bedrock Aquifer). The Site is not situated within a groundwater Source Protection Zone (SPZ).

4. SEQUENTIAL / EXCEPTION TESTS

4.1 Sequential Test

The Site is an allocated site, for mixed use development including residential, within the Local Plan as site NE2 41-49 Nine Elms Lane, and 49-59 Battersea Park Road, SW8. The Site has previously been granted planning application (ref: 2015/6813) for a mixed use development including residential uses and was approved on the 28th March 2019.

As a consequence and in accordance with Policy LP12, the Site is deemed to have passed the Sequential Test. Therefore, the Sequential Test will not need to be undertaken as part of this planning application.

4.2 Exception Test

If, following application of the Sequential Test, it is not possible, consistent with wider sustainability objectives, for the development to be located in zones with a lower probability of flooding; the Exception Test can be applied if appropriate. For the Exception Test to be passed:

- the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
- the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

4.2.1 Wider Sustainability Benefits

The key emphasis of the NPPF is to achieve sustainable development (see Para. 7 of the NPPF). The NPPF provides the following aims under the umbrella of sustainable development.

1. Building a strong, competitive economy
2. Ensuring the vitality of town centres
3. Supporting a prosperous rural economy
4. Promoting sustainable transport
5. Supporting high quality communications infrastructure
6. Delivering a wide choice of high-quality homes
7. Requiring good design
8. Promoting healthy communities
9. Protecting Green Belt land
10. Meeting the challenge of climate change, flooding and coastal change
11. Conserving and enhancing the natural environment
12. Conserving and enhancing the historic environment

13. Facilitating the sustainable use of mineral

The Site is an allocated site, for mixed use development including residential, within the Local Plan as site NE2 41-49 Nine Elms Lane, and 49-59 Battersea Park Road, SW8. The Site has previously been granted planning application (ref: 2015/6813) for a mixed use development including residential uses and was approved on the 28th March 2019. Therefore, the proposed use reflects Planning Policy (National, Regional, and Local) and will provide wider sustainability benefits.

Accessible and Sustainable

The Councils' policies make clear for the need to focus on new development in locations which are accessible and sustainable, making use of existing infrastructure and community facilities and services.

The proposed buildings are in close proximity to the campus. The Site provides sustainable bus and cycle connectivity. These points minimise the potential usage of cars, and the scheme is actively discouraging private car use.

This area is a sustainable location to accommodate new development in terms of the facilities it offers, which include shops and universities etc. The settlement hierarchy within the Local Plan guides the distribution and scale of development in a sustainable manner, reflecting the needs, roles and functions of each settlement. New development should support or improve its role as a focus for social and economic activity. Many local facilities and services are inside the ideal walking distances from the Site meaning that there is potential to reduce the need to travel by car.

Use of Brownfield Land

The development will see brownfield land come forward for redevelopment and will be actively used.

Improved Landscape & Biodiversity

The proposed development of the Site will result in improvement and enhancement in the landscape character and biodiversity of the site and surrounding area. The existing site is constructed entirely from hardstanding, the proposed scheme will increase the landscaped and soft areas of the site improving the biodiversity of the Site and surrounding area providing betterment compared to the existing situation. A landscape strategy has been prepared by to enhance the courtyard area for the enjoyment of residents.

Employment

Development on this Site will generate employment during the construction period and thereby provide some protection to the local economy. The commercial space will also provide on-going employment opportunities. It will also support those who provide on-going services (e.g. maintenance tradesmen etc.).

It is considered that the proposals for the Site offers both environmental and economic benefits which accord with the principles of design and sustainable development, as set out in the NPPF. The proposed development will contribute to the economic function of the local community.

Improvements in Drainage

The proposed drainage design will seek to minimise future surface water runoff from the Site including the effects of climate change, with surface water runoff being discharged at a restricted runoff rate through the use of SuDS.

The increase and improvements in landscaped areas of the Site will also lead to an infiltration potential of the Site which will allow more rainwater to infiltrate into the soil substrate compared to the existing situation.

Conclusion

In conclusion, it is felt that the development will have wider sustainability benefits to the community that outweigh flood risk. It will help the growth of the local economy and will provide direct and indirect employment opportunities. The proposed development will incorporate a number of mitigation measures (see below); these works to reduce the flood risk on the Site will enhance the sustainability of the Site for the wider community while also contributing to meeting housing need as detailed within the planning statement.

The development proposals should therefore be considered by the LPA to satisfy the first condition of the Exceptions Test as set out in the NPPF. The development proposal sufficiently provides wider sustainability benefits to the community, consisting of both the University, residents and business owners within the vicinity of the Site, as well as the wider community, that outweigh the potential flood risk.

4.2.2 Safe, without increasing flood risk elsewhere

The FRA prepared for this scheme, addresses the risk of flooding to the development and the areas within the vicinity of the Site. The proposed scheme will provide flood mitigation measures as per Environment Agency guidance and the London Borough of Wandsworth SFRA. The FRA shows that the development is safe from flooding and does not increase flood risk elsewhere. The FRA details safe access and egress routes and provides a drainage strategy which aims to manage and minimise future surface water runoff from the Site.

4.3 Summary

The London Borough of Wandsworth SFRA concludes that allocated site NE2 41-49 Nine Elms Lane, and 49-59 Battersea Park Road, SW8 is likely to pass the Exception Test taking into account this and the above, the development proposals should therefore be considered by the LPA to satisfy the Exception Test as set out in the NPPF.

5. FLOOD RISK

5.1 Sources of Flooding

All sources of flooding have been considered, these are; fluvial (river) flooding, tidal (coastal) flooding, groundwater flooding, surface water (pluvial) flooding, sewer flooding and flooding from artificial drainage systems/infrastructure failure.

5.2 Historic Flooding

The Environment Agency historic flood outlines show that the Site has not historically flooded however, flooding occurred in 1928 within the vicinity of the Site. It is considered that significant flood defences have been installed in the area since the 1928 flood event occurred.

This has been confirmed with the London Borough of Wandsworth SFRA. After this flood event the defences alongside the Thames were raised by the 1930 Act of Parliament and the Site is now protected by these raised walls and the Thames Barrier.

There are no records of anecdotal information of flooding at the Site including within the British Hydrological Society “Chronology of British Hydrological Events”. No other historical records of flooding for the Site have been recorded. Therefore, it has been assumed that the Site has not flooded within the recent past.

5.3 Existing Flood Defence Measures

The Site benefits from an extensive network of flood defences that protects London from extreme flood events. The Thames Barrier, located in Woolwich Reach lies downstream of the Site and is the main structure of the Thames Tidal Defence system. When closed, the barrier prevents extreme storm surges from flowing up the estuary and flooding central London. The Tidal Defence system also includes over 300km of walls and embankments and more than 400 minor barriers and flood gates to prevent by-passing of the barrier. The Thames Barrier also provides protection from tidal flooding and storm surges.

The defences are all raised, man-made and privately owned. It is the riparian owners’ responsibility to ensure they are maintained to a crest level of 5.41mAOD (the Flood Defence Level in this reach of the Thames); however there is still a risk of flooding in the event of a breach and/or overtopping of the defences.

The level of the defences is above the 1 in 1000 (0.1%) annual probability flood level over the next 100 years and hence these defences provide a good standard of protection. The current condition for the defences in the area is 2 (good), on a scale of 1 (very good) to 5 (very poor). Substantial investment has been committed to the protection of London, both now and into the future, as set out by the Environment Agency’s ‘Thames Estuary TE2100’ Strategy.

Further risk management measures will be used to protect the Site from flooding these are discussed in Section 6.0.

5.4 Thames Estuary (TE2100) Study

The Thames Estuary 2100[4] project was established in 2002 by the Environment Agency with the intention of developing a strategic flood risk management plan for London and the Thames estuary through to the end of the century. The Plan splits the study area into 23 'policy units' which share similar characteristics, and each unit is appraised and given an action plan, split into epochs.

It is an adaptive plan for managing the estuary, including the tidal defence system, until 2100 so that current standards of flood protection are maintained or improved taking into account climate change effects e.g. sea level rise. The Plan has 3 phases of activity:

- *Until 2035 – maintain and improve current defences, safeguard areas required for future improvements, and monitor climate change indicators.*
- *2035-2050 – raise existing walls, defences & smaller barriers whilst reshaping the riverside environment.*
- *2050-2100 – determine and implement an option for the future of the Thames Barrier, and adapt other defences as required to work alongside this to protect the estuary.*

The Thames Estuary 2100 Plan can be found at: https://www.gov.uk/government/publications/thamesestuary-2100-te2100

5.5 Environment Agency Flood Zones

A review of the Environment Agency's flood map indicates that the Site is located within Flood Zones 3a and therefore has a 'high probability' of fluvial/tidal flooding as shown in Drawing 956/FRA/002. Flood Zone 3a has a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

The Site does not perform any function in relation to the provision of flood storage or conveyance and is not part of the functional flood plain i.e. Flood Zone 3b therefore, the Site is located within Flood Zone 3a. The London Borough of Wandsworth SFRA confirms that the Site is located within Flood Zone 3a.

The Flood Zones are the current best information on the extent of the extremes of flooding from rivers or the sea that would occur without the presence of flood defences, because these can be breached, overtopped and may not be in existence for the lifetime of the development. The Environment Agency Flood Zones and acceptable development types are explained in Table 5.1. Table 5.1 shows that some development types are generally acceptable in Flood Zone 3a.

[4] Please see the 'Thames Estuary 2100' document on the Environment Agency website for the short, medium and long term Flood Risk Management strategy for London: http://www.environment-agency.gov.uk/homeandleisure/floods/125045.aspx

Table 5.1 - Environment Agency Flood Zones and Appropriate Land Use

Flood Zone	Probability	Explanation	Appropriate Land Use
Zone 1	Low	Less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%)	All development types generally acceptable
Zone 2	Medium	Between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% 0.1%) in any year	Most development type are generally acceptable
Zone 3a	High	A 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year	Some development types not acceptable
Zone 3b	'Functional Floodplain'	Land where water has to be flow or be stored in times of flood. SFRAs should identify this zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1% flood, or at another probability to be agreed between the LPA and the Environment Agency, including water conveyance routes)	Some development types not acceptable

5.6 Flood Vulnerability

In the Planning Practice Guidance to the NPPF (Table 1) appropriate uses have been identified for the Flood Zones. Applying the Flood Risk Vulnerability Classification in Table 2 and 3 of the Planning Practice Guidance to the NPPF, the proposed student accommodation is classified as 'more vulnerable' and the commercial and non-residential uses are classified as 'less vulnerable'. The commercial and non-residential uses will be located on the ground floor with the student accommodation being located on the first floor and above.

Table 5.2 of this report and Table 3 of the Planning Practice Guidance to the NPPF states that 'more vulnerable' and 'less vulnerable' uses are appropriate within Flood Zone 3a.

Table 5.2 - Flood Risk Vulnerability and Flood Zone 'Compatibility' as identified in Table 3 of the Planning Practice Guidance to the NPPF

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception test required	✓	✓
Zone 3a	Exception test required	✓	×	Exception test required	✓
Zone 3b 'Functional Floodplain'	Exception test required	✓	×	×	×

Key: ✓: Development is appropriate, ×: Development should not be permitted.

5.7 Climate Change

Projections of future climate change, in the UK, indicate more frequent, short-duration, high intensity rainfall and more frequent periods of long duration rainfall. Guidance included within the NPPF recommends that the effects of climate change are incorporated into FRA.

Recommended precautionary sensitivity ranges for peak rainfall intensities and peak river flows are outlined in the associated Planning Practice Guidance to the NPPF[5]. The flood risk assessments: climate change allowances guidance recommends that for 'more vulnerable' uses in Flood Zone 3a that the central allowances are used.

5.8 Fluvial (river) Flooding

The River Thames has been heavily modified over time with the growth of London, including the construction of raised defences along much of its length (within London). As a result, the direct risk to the Site as a result of fluvial flooding alone is virtually negligible. Should a fluvial flooding event within the upper catchment coincide with a particularly high tide in the lower reaches of the River Thames however, the Site is at risk of flooding.

The River Thames poses a potential risk of flooding to properties within Wandsworth; all properties within the borough are currently protected from combined tidal and fluvial flooding by the River Thames Tidal Defences (TTD) up to the 1 in 1000 year event.

This degree of protection is effective provided that the River Thames Barrier is operated to protect against storm surges from the North Sea and that there is a sufficient storage pool behind the barrier to accommodate the River Thames when it is shut during extreme fluvial events at high tides. The TTD are currently being

[5] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#high-allowances

reviewed (as part of the TE2100 Strategy) to protect against climate change beyond 2030.

Therefore, it can be concluded that fluvial flood risk from the River Thames poses a residual risk to the Site. Therefore, the risk of flooding from the fluvial River Thames is considered to be of low significance. The risk from the River Thames will be managed and mitigated by using a number of mitigation measures to manage and reduce the overall flood risk at the Site (see Section 6.0).

5.9 Tidal (coastal) Flooding

In extreme events the River Thames may overtop its banks and inundate the Site with floodwater. The London Borough of Wandsworth SFRA confirms that the main source of flood risk to the Borough is from tidal sources. The primary risk of flooding within London is as a result of a surge tide. Should this 'surge' coincide with a particularly high tide and/or fluvial flooding in the upper reaches of the catchment, the River Thames within London becomes in effect a 'basin' with water approaching in both directions.

Actual Risk

Considerable investment has been made in the provision of the flood defences to protect Greater London from tidal flooding. The Thames Tidal Barrier was constructed specifically to prevent the tidal surge passing upstream into the built up areas of London. Not only does this (in conjunction with the raised River Thames flood defences) protect London from unusually high river levels as a result of a surge tide, but it also ensures that there is capacity in the river channel to safely store fluvial floodwaters that are travelling downstream from the upper catchment.

Table 5.3 shows the Environment Agency present day water levels for the tidal River Thames adjacent to the Site from the Thames Estuary 2100 study (TE2100). The TE2100 present day levels upstream are the highest levels permitted by the River Thames Barrier. The defence levels (left defence, right defence) are the minimum levels to which the defences should be built. Table 5.3 confirms that the Site is currently protected up to and including the 1 in 1000 year event. The Maximum Likely Water Level is 4.86mAOD and the existing defence level is 5.41mAOD.

Table 5.3 - Tidal River Thames TE2100 Present Day Levels

Node	Extreme Water Level (mAOD)	Left Defence	Right Defence	Allowing for future defence raising to level of...	
				Left Bank	Right Bank
2.30	4.86	5.41	5.41	6.35	6.35

Table 5.4 shows the Environment Agency climate change water levels for the tidal River Thames adjacent to the Site from the Thames Estuary 2100 study (TE2100). Table 5.4 shows that the Site will also be protected up to and including the 1 in 1000 year event when climate change is taken into account and the flood defences are maintained as outlined with the TE2100 study. The Design Water Level is 5.83mAOD and the proposed defence level is 6.35mAOD.

The Site is protected by flood defences up to the 1 in 1000 (0.1%) year event, the actual flood risk posed to the Site is very low.

Table 5.4 - Tidal River Thames TE2100 Climate Change Levels

Node	2065 to 2100		2100	
	Design Water Level	Defence Level (both banks)	Design Water Level	Defence Level (both banks)
2.30	5.35	5.85	5.81	6.35

Residual Risk

The flood defences can only protect up to a point, they may malfunction, can be breached and have a finite structure life. Therefore, there is a residual risk of tidal flooding. The Environment Agency have modelled flood extents due to a breach in the flood defences as part of the Environment Agency's 'Thames Tidal Upriver Breach Inundation Modelling Study 2017', in which a series of breaches were simulated along the River Thames from Teddington to the Thames Barrier. Table 5.5 shows the Environment Agency breach water levels for the Site.

Table 5.5 - Thames Tidal Upriver Breach Inundation Modelling – 2017

Node	Eastings	Northings	Modelled Levels for Max Likely Water Level (mAOD)	
			2014	2100
1	529277	177310	4.49	4.91
2	529237	177285	Nill Return	4.60
3	529297	177280	4.25	4.71
4	529262	177275	4.25	4.71
5	529332	177255	4.39	4.72
6	529292	177250	4.25	4.71
7	529362	177240	4.33	4.61
8	529297	177225	4.03	4.44
9	529372	177215	4.22	4.60
10	529417	177215	4.34	4.60

Site ground levels are between 4.60mAOD and 3.30mAOD, therefore, the Site may be inundated with floodwater to a maximum depth of 1.19m in 2014 and to a maximum depth of 1.61m in 2100 due to a breach in the flood defences, which is unlikely.

Therefore, it can be concluded that tidal flooding from the River Thames poses a residual risk to the Site. The risk of flooding from the River Thames is considered to be of low significance. The risk from the River Thames will be managed and mitigated by using a number of mitigation measures to manage and reduce the overall flood risk at the Site (see Section 6.0).

5.10 Groundwater Flooding

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded. Groundwater flooding tends to occur sporadically in both location and time. When groundwater flooding does occur, it tends to mostly affect low-lying areas, below surface infrastructure and buildings (for example, tunnels, basements and car parks) underlain by permeable rocks (aquifers).

Site conditions suggest a low probability of groundwater flooding. The London Borough of Wandsworth SFRA confirms that there is *"limited potential for groundwater flooding"*. The susceptibility of the Site to groundwater flooding, based on the underlying geological conditions, is low. There are no records of groundwater flooding at or near to the Site. It can therefore be concluded that the risk of groundwater flooding is not significant.

5.11 Surface Water (pluvial) Flooding

The soil condition at the Site, and within the vicinity of the Site and the topography of the Site suggest that the Site is relatively well drained and surface water flooding would not be expected to accumulate to any significant depths. Surface water flooding tends to occur sporadically in both location and time such surface water would tend to be confined to the streets around the development.

Drawing 956/FRA/003 confirms that the majority of the Site has a very low risk of surface water flooding with a chance of flooding of less than 1 in 1000 years (0.1%). However, a very small proportion of the Site and areas within the vicinity of the Site are shown to have a low to high risk of surface water flooding with a chance of flooding of 1 in 1000 years (0.1%) to greater than 1 in 30 years (3.3%). This may result in small areas of ponding on the Site boundary.

It can therefore be concluded that the risk of surface water flooding is of low significance. The risk from the surface water sources will be managed and mitigated by using a number of risk management measures to manage and reduce the overall flood risk at the Site (see Section 6.0).

5.12 Sewer Flooding

Sewer flooding occurs when urban drainage networks become overwhelmed and maximum capacity is reached. This can occur if there is a blockage in the network causing water to back up behind it or if the sheer volume of water draining into the system is too great to be handled. Sewer flooding tends to occur sporadically in both location and time such flood flows would tend to be confined to the streets around the development.

There are existing public sewers within roads adjacent to the Site these will inevitably have a limited capacity so in extreme conditions there would be surcharges, which may in turn cause flooding. Flood flows could also be generated by burst water mains, but these would tend to be of a restricted and much lower volume than weather generated events and so can be discounted for

the purposes of this assessment. Given the design parameters normally used for drainage design in recent times and allowing for some deterioration in the performance of the installed systems, which are likely to have been in place for many years, an appropriate flood risk probability from this source could be assumed to have a return period in the order of 1 in 10 to 1 in 30 years.

The provision of adequate level difference between the ground floors and adjacent ground level would reduce the annual probability of damage to property from this source to 1 in 100 years or less. The London Borough of Wandsworth SFRA indicates that there have been limited numbers of sewer flooding within the Site's postcode area. It can therefore be concluded that the risk of sewer flooding is of low significance.

The risk from the sewer sources will be managed and mitigated by using a number of risk management measures to manage and reduce the overall flood risk at the Site (see Section 6.0).

5.13 Flooding from Artificial Drainage Systems/Infrastructure Failure

Reservoirs are located within the vicinity of the Site. The Environment Agency Reservoir flood map shows that the Site is at risk of reservoir flooding (see Drawing 956/FRA/4). Reservoir flooding is extremely unlikely; reservoirs in the UK have a very good safety record. There has been no loss of life in the UK from reservoir flooding since 1925.

Since then reservoir safety legislation has been introduced to make sure reservoirs are well maintained. The hazard is well managed through effective legislation and it is unlikely that the impact zone downstream of the reservoirs should preclude the proposed development. There are no other nearby artificial water bodies, water channels and artificial drainage systems that could be considered a flood risk to the Site. The risk of flooding from these sources is considered to be not significant.

5.14 Effects of the Development on Flood Risk

The Site is protected by flood defences up to the 1 in 1000 (0.1%) year event and the Site does not perform any function in relation to the provision of flood storage or conveyance and therefore there will be no impact on floodplain storage or flow routes.

5.15 Summary of Site Specific Flood Risk Assessment

A summary of the sources of flooding and a review of the risk posed by each source at the Site is shown in Table 5.6.

The principal flood risk to the Site is from tidal flooding from the River Thames. The Site is located within Flood Zone 3a and therefore has a 'high probability' of fluvial flooding with a 1 in 100 or greater annual probability of river flooding (>1%) in any year. The proposed development is classified as 'more vulnerable', 'more

vulnerable' uses are appropriate within Flood Zone 3a after the completion of a satisfactory FRA.

However, the flood defence measures identified are expected to afford the Site significant protection from tidal flooding with a standard of protection of 1 in 1000 years. Therefore, the actual flood risk is very low and the Site is unlikely to flood except in extreme conditions i.e. tidal flood events of greater than the 1 in 1000 year event from the tidal River Thames. The Site is protected by flood defences up to the 1 in 1000 (0.1%) year event, the actual flood risk posed to the Site is very low.

Table 5.6 - Risk Posed by Flooding Sources

Sources of Flooding	Potential Flood Risk	Potential Source	Probability/Significance
Fluvial (river) Flooding	Yes	River Thames	Low
Tidal (coastal) Flooding	Yes	River Thames	Low
Groundwater Flooding	No	None Reported	Not significant
Surface Water (pluvial) Flooding	Yes	Poor Permeability	Low
Sewer Flooding	Yes	Local Sewers	Low
Flooding from Artificial Drainage Systems/Infrastructure Failure	Yes	Reservoirs	Not significant

The flood defences can only protect up to a point, they may malfunction, can be breached and have a finite structure life. Therefore, there is a residual risk of tidal flooding. If a breach in the flood defences was to occur, which is very unlikely, the Site may be inundated with floodwater to a maximum depth of 1.19m in 2014 and to a maximum depth of 1.61m in 2100. Therefore, it can be concluded that tidal flooding from the River Thames poses a residual risk to the Site. The risk of flooding from the River Thames is considered to be of low significance.

A number of secondary flooding sources have been identified which may pose a low significant risk to the Site. These are:

- Fluvial Flooding
- Surface Water Flooding
- Sewer Flooding

The flooding sources will only inundate the Site to a relatively low water depth and water velocity, will only last a short period of time, in very extreme cases and will not have an impact on the whole of the proposed development Site. The risk from all sources will be managed and mitigated by using a number of risk management measures to manage and reduce the overall flood risk at the Site (see Section 6.0). There are existing flood defence measures that protect the Site

and further property level protection measures are used to managed and mitigate the flood risk.

6. RISK MANAGEMENT

6.1 Introduction

In Flood Zone 3a, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout, form of the development and the use of flood mitigation measures including SuDS techniques. The flooding sources will have to mitigated on the Site by using a number of techniques, and mitigation strategies to manage and reduce the overall flood risk at the Site. These will be used to ensure the development will be safe and there is:

- Minimal risk to life;
- Minimal disruption to people living and working in the area;
- Minimal potential damage to property;
- Minimal impact of the proposed development on flood risk generally; and;
- Minimal disruption to natural heritage.

6.2 Sequential Arrangement

The sequential approach has been applied within the Site by locating the most vulnerable elements of the development in the lowest risk areas. The most vulnerable use, the student accommodation will be situated on the first floor and above, at a lower risk of flooding with the more flood-compatible uses, the commercial and non-residential uses will be located on the ground floor.

6.3 Finished Floor Levels

The proposed residential uses will be located on the first floor and above well above any floodwater levels at a minimum of 8.00mAOD. Therefore, the residential accommodation will not be inundated with floodwater due to a breach in the flood defences.

The non-residential units on the ground floor will have a finished floor level of 4.00mAOD. It is recognised however that owing to limited headroom constraints, massing, planning policy and Building Regulations it is considered impractical to raise the finished floor levels further. Therefore, in order to mitigate against this, it is recommended that the occupants of the proposed properties are encouraged to sign up to receive flood warnings from the Environment Agency and a Flood Risk Management Plan to a safe area away from the buildings during times of flood. It is also proposed that flood protection measures are employed within the building design to reduce the overall risk to the occupants.

A combination of resistance (proofing) and resilience measures will be included to provide further protection. This is discussed below.

6.4 First Floor Accommodation

Safe refuge above floodwater levels should be designed into new developments within flood risk zones. Communal spaces will be located on the first floor as well as the ground floor of the buildings. This will allow occupants to retreat to higher floor levels if needed.

This provides a 'safe haven' above any floodwater levels. This will enable rapid escape should flooding occur which is unlikely. The upper floors are accessed via internal stairs and are sufficient in size to safely house all occupants of the buildings. The 'safe haven' will only be required in very extreme events or if a flood warning has not been received. The 'safe haven' will help make the development safe.

The safety of people always needs to be considered, by providing a safe place of refuge above flood levels. It is good industry practice to provide a 'fail safe' safe refuge above the worst predicted flood level. In the unlikely event that advance flood warnings are not heeded, safe refuge would be afforded to Site users within the buildings.

6.5 Flood Resilience and Resistance

The development of the layout should always consider that the Site is potentially at risk from an extreme event and as such the implementation of flood resilience and resistance methods should be assessed.

To make the buildings more resistant to seepage the following measures will be incorporated. Sealant will be used around external doors and windows. All windows will be located above the ground levels. All external doors and windows will be constructed from robust materials. The walls of the buildings will be thick.

To improve the buildings resilience to flooding the following measures will be incorporated. All electrical wiring, switches, sockets, socket outlets, electrical, and gas meters etc. will be located a minimum of 450mm above the finished floor levels.

Additionally ground levels will be profiled to fall away from the built development to mitigate any potential residual flood risk posed by localised surface water runoff.

6.6 Flood Warning

The Environment Agency's Flood Warning Service covers this area, this is a free service that provides flood warnings direct by telephone, mobile, email, SMS text message and fax. The Site will register for this free service. This would give Site users prior warning of a fluvial/tidal flood event.

The local area is covered by the Environment Agency Flood Warning Areas for 'Tidal Thames from Deptford Creek to Wandsworth Bridge'. Residents of the Site should ensure they are signed up to the Environment Agency Flood Warning system.

6.7 Flood Risk Management Plan

A Flood Risk Management Plan (FRMP) outlining the precautions and actions you should take when a flood event is anticipated to help reduce the impact and damage flooding may cause will be developed. The FRMP is a 'living' document and therefore should be periodically reviewed and updated to provide advice and guidance to occupants in the event of an extreme flood. The FRMP will therefore reduce the vulnerability of the occupants to flooding and makes them aware of the mechanisms of flooding at the Site.

6.8 Access and Egress

Paragraph 167 subsection e of the NPPF requires that, where required, safe access and escape is available to/from new developments in flood risk areas. Access routes should be such that occupants can safely access and exit their houses in design flood conditions. These routes must also provide the emergency services with access to the development during a flood event and enable flood defence authorities to carry out any necessary duties during the period of flood.

The evacuation of the Site will occur when the relevant authorities deem there is a serious risk of flooding to an area. The advance warning should ensure that all occupants will vacate the Site. The Site is located within an Environment Agency Flood Warning area therefore water levels within the River Thames will be monitored, and information relayed quickly to the management company and residents in the event of a flood to provide sufficient evacuation time.

This allows the Environment Agency, with its current flood warning system, to provide forewarning of two (2) days of a pending flood event. There is therefore considered to be a substantial lead time before the peak of a flood event at the Site.

Access to the Site is provided via Sleaford Street to the east of the Site. The Site is protected by flood defences up to the 1 in 1000 (0.1%) year event, the actual flood risk posed to the Site is very low. However, if a breach in the defences was to occur the Site and Sleaford Streat may be inundated with floodwater, therefore the FRMP will be developed, as described above.

The closest designated emergency rest centre for this Site is R.O.S.E. (Residents of Savona Estate), Ascalon Street, to the south of the Site. The Access and Egress Routes shown in Drawing 956/FRA/5 indicates the exit routes that all people (i.e. residents and visitors) on Site should follow once a Severe Flood Warning has been received. People should make their way to areas outside of the flood zone.

In the event of a Severe Flood Warning, vital belongings, including waterproof clothing, necessary medication and essentials for infants and children will be collected. It should be ensured that all occupiers and visitors to the Site are accounted for, and then exit the Site using the routes shown in Drawing 956/FRA/5. Safe access and egress can be maintained for all events up to and including the 1 in 1000 year event in accordance with the NPPF and Environment Agency guidance.

6.9 Residual Risk

The mitigation measures detailed above show that the flood risk can be effectively managed and therefore the consequences of flooding are acceptable. As such, the residual risk is considered to be acceptable for the lifetime of the development.

7. SUMMARY AND CONCLUSION

7.1 Introduction

This report presents an FRA in accordance with the NPPF for the proposed development at 41-49 (Bookers) and 49-59 (BMW) Battersea Park Road. This FRA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will need to be managed so that the development remains safe throughout the lifetime, taking climate change into account.

7.2 Sequential / Exception Tests

The development proposals should be considered by the LPA to satisfy the Sequential and Exception Tests as set out in the NPPF.

7.3 Flood Risk

The principal flood risk to the Site is from tidal flooding from the River Thames. The Site is located within Flood Zone 3a and therefore has a 'high probability' of fluvial flooding with a 1 in 100 or greater annual probability of river flooding (>1%) in any year. The proposed development is classified as 'more vulnerable', 'more vulnerable' uses are appropriate within Flood Zone 3a after the completion of a satisfactory FRA.

However, the flood defence measures identified are expected to afford the Site significant protection from tidal flooding with a standard of protection of 1 in 1000 years. Therefore, the actual flood risk is very low and the Site is unlikely to flood except in extreme conditions i.e. tidal flood events of greater than the 1 in 1000 year event from the tidal River Thames. The Site is protected by flood defences up to the 1 in 1000 (0.1%) year event, the actual flood risk posed to the Site is very low.

The flood defences can only protect up to a point, they may malfunction, can be breached and have a finite structure life. Therefore, there is a residual risk of tidal flooding. If a breach in the flood defences was to occur, which is very unlikely, the Site may be inundated with floodwater to a maximum depth of 1.19m in 2014 and to a maximum depth of 1.61m in 2100. Therefore, it can be concluded that tidal flooding from the River Thames poses a residual risk to the Site. The risk of flooding from the River Thames is considered to be of low significance.

A number of secondary flooding sources have been identified which may pose a low significant risk to the Site. These are:

- Fluvial Flooding
- Surface Water Flooding
- Sewer Flooding

The flooding sources will only inundate the Site to a relatively low water depth and water velocity, will only last a short period of time, in very extreme cases and will not have an impact on the whole of the proposed development Site. The risk from all sources will be managed and mitigated by using a number of risk management measures to manage and reduce the overall flood risk at the Site. There are existing flood defence measures that protect the Site and further property level protection measures are used to managed and mitigate the flood risk.

7.4 Risk Management

The flooding sources will be managed on the Site by using a number of mitigation strategies to manage and reduce the overall flood risk at the Site and will ensure the development will be safe. Measures used:

Sequential Arrangement: The sequential approach has been applied within the Site by locating the most vulnerable elements of the development in the lowest risk areas. The most vulnerable use, the student accommodation will be situated on the first floor and above, at a lower risk of flooding with the more flood-compatible uses, the commercial and non-residential uses will be located on the ground floor.

Finished Floor Levels: The proposed residential uses will be located on the first floor and above well above any floodwater levels at a minimum of 8.00mAOD. Therefore, the residential accommodation will not be inundated with floodwater due to a breach in the flood defences.

The non-residential units on the ground floor will have a finished floor level of 4.00mAOD. It is recognised however that owing to limited headroom constraints, massing, planning policy and Building Regulations it is considered impractical to raise the finished floor levels further. Therefore, in order to mitigate against this, it is recommended that the occupants of the proposed properties sign up to receive flood warnings from the Environment Agency and a flood evacuation plan to a safe area away from the buildings during times of flood. It is also proposed that flood protection measures are employed within the building design to reduce the overall risk to the occupants.

A combination of resistance (proofing) and resilience measures will be included to provide further protection. This is discussed below.

First Floor Accommodation: Safe refuge above floodwater levels should be designed into new developments within flood risk zones. Communal spaces will be located on the first floor as well as the ground floor of the buildings. This will allow occupants to retreat to higher floor levels if needed.

This provides a ‘safe haven’ above any floodwater levels. This will enable rapid escape should flooding occur which is unlikely. The upper floors are accessed via internal stairs and are sufficient in size to safely house all occupants of the buildings. The ‘safe haven’ will only be required in very extreme events or if a flood warning has not been received. The ‘safe haven’ will help make the development safe.

The safety of people always needs to be considered, by providing a safe place of refuge above flood levels. It is good industry practice to provide a 'fail safe' safe refuge above the worst predicted flood level. In the unlikely event that advance flood warnings are not heeded, safe refuge would be afforded to Site users within the buildings.

Flood Resilience and Resistance: To make the buildings more resistant to seepage the following measures will be incorporated. Sealant will be used around external doors and windows. All windows will be located above the ground levels. All external doors and windows will be constructed from robust materials. The walls of the buildings will be thick.

To improve the buildings resilience to flooding the following measures will be incorporated. All electrical wiring, switches, sockets, socket outlets, electrical, and gas meters etc. will be located a minimum of 450mm above the finished floor levels.

Additionally ground levels will be profiled to fall away from the built development to mitigate any potential residual flood risk posed by localised surface water runoff.

Flood Warning: The Environment Agency's Flood Warning Service covers this area, this is a free service that provides flood warnings direct by telephone, mobile, email, SMS text message and fax. The Site will register for this free service. This would give Site users prior warning of a fluvial/tidal flood event.

Flood Risk Management Plan: A FRMP outlining the precautions and actions you should take when a flood event is anticipated to help reduce the impact and

Access and Egress: The evacuation of the Site will occur when the relevant authorities deem there is a serious risk of flooding to an area. The advance warning should ensure that all occupants will vacate the Site. The Site is located within an Environment Agency Flood Warning area therefore water levels within the River Thames will be monitored, and information relayed quickly to the management company and residents in the event of a flood to provide sufficient evacuation time.

This allows the Environment Agency, with its current flood warning system, to provide forewarning of two (2) days of a pending flood event. There is therefore considered to be a substantial lead time before the peak of a flood event at the Site.

Access to the Site is provided via Sleaford Street to the east of the Site. The Site is protected by flood defences up to the 1 in 1000 (0.1%) year event, the actual flood risk posed to the Site is very low. However, if a breach in the defences was to occur the Site and Sleaford Streat may be inundated with floodwater, therefore the FRMP will be developed, as described above.

The closest designated emergency rest centre for this Site is R.O.S.E. (Residents of Savona Estate), Ascalon Street, to the south of the Site. The Access and Egress Route indicates the exit routes that all people (i.e. residents and visitors) on Site should follow once a Severe Flood Warning has been received. People should make their way to areas outside of the flood zone.

In the event of a Severe Flood Warning, vital belongings, including waterproof clothing, necessary medication and essentials for infants and children will be collected. It should be ensured that all occupiers and visitors to the Site are accounted for, and then exit the Site using the routes shown in Drawing 956/FRA/5. Safe access and egress can be maintained for all events up to and including the 1 in 1000 year event in accordance with the NPPF and Environment Agency guidance.

7.5 Conclusion

In conclusion, the proposed development, would be expected to remain dry in all but the most extreme conditions. Providing the recommendations made in this FRA are instigated, flood risk from all sources would be minimised, the consequences of flooding are acceptable and the development would be in accordance with the requirements of the NPPF, the London Plan and the London Borough of Wandsworth Core Strategy.

This FRA demonstrates that the proposed development would be operated with minimal risk from flooding, would not increase flood risk elsewhere. The development should not therefore be precluded on the grounds of flood risk.

APPENDIX

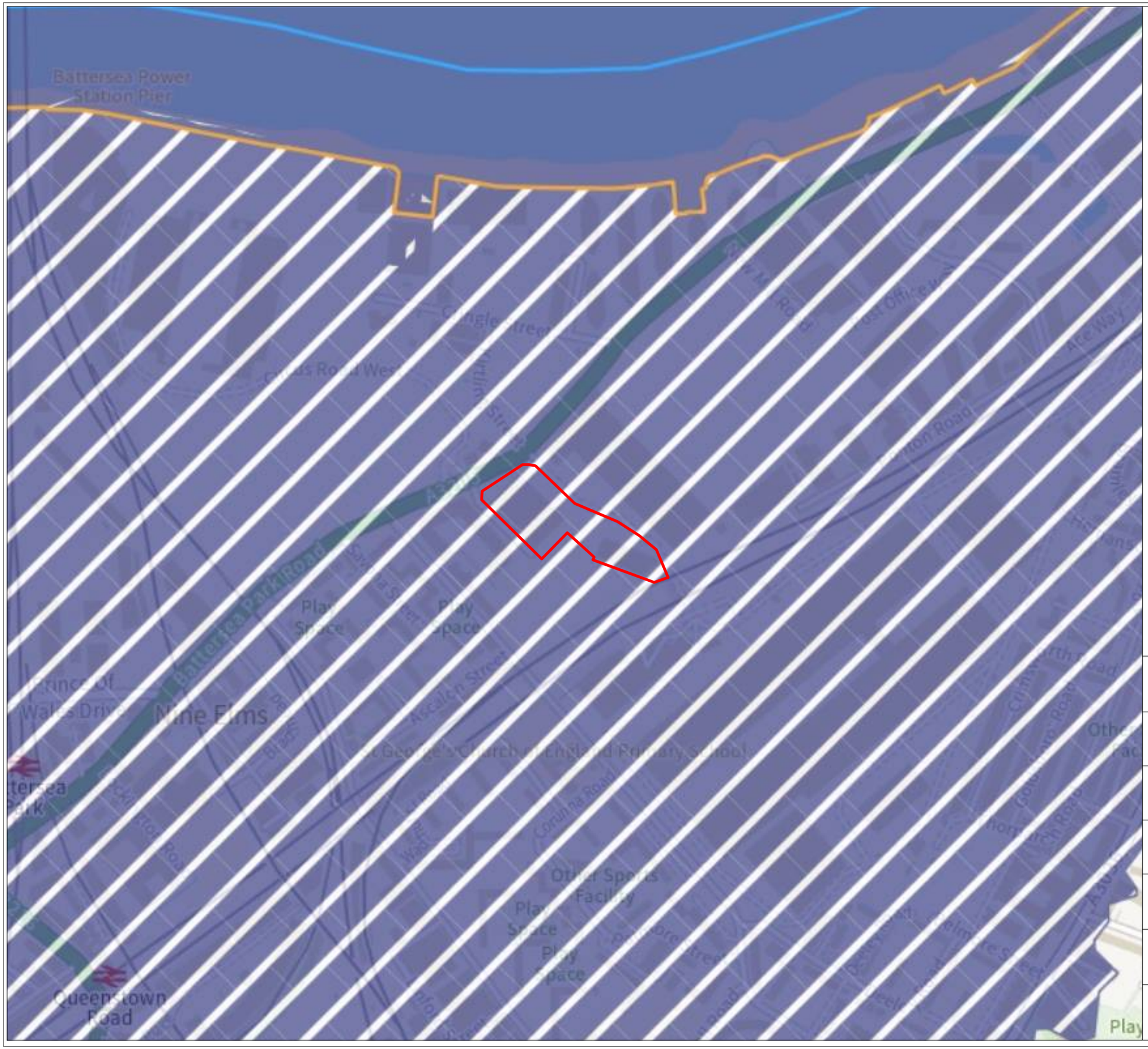
Appendix A – Drawings

KEY

Site Boundary

APEX CONSULTING ENGINEERS

PROJECT	Battersea Park Road
CLIENT	Watkin Jones Group
TITLE	Site Location
PROJECT REF	956-TSY-ZZ-XX-DR-C-002
DRAWING NO	956/FRA/001
SCALE	NTS@A3
DATE	March 2022

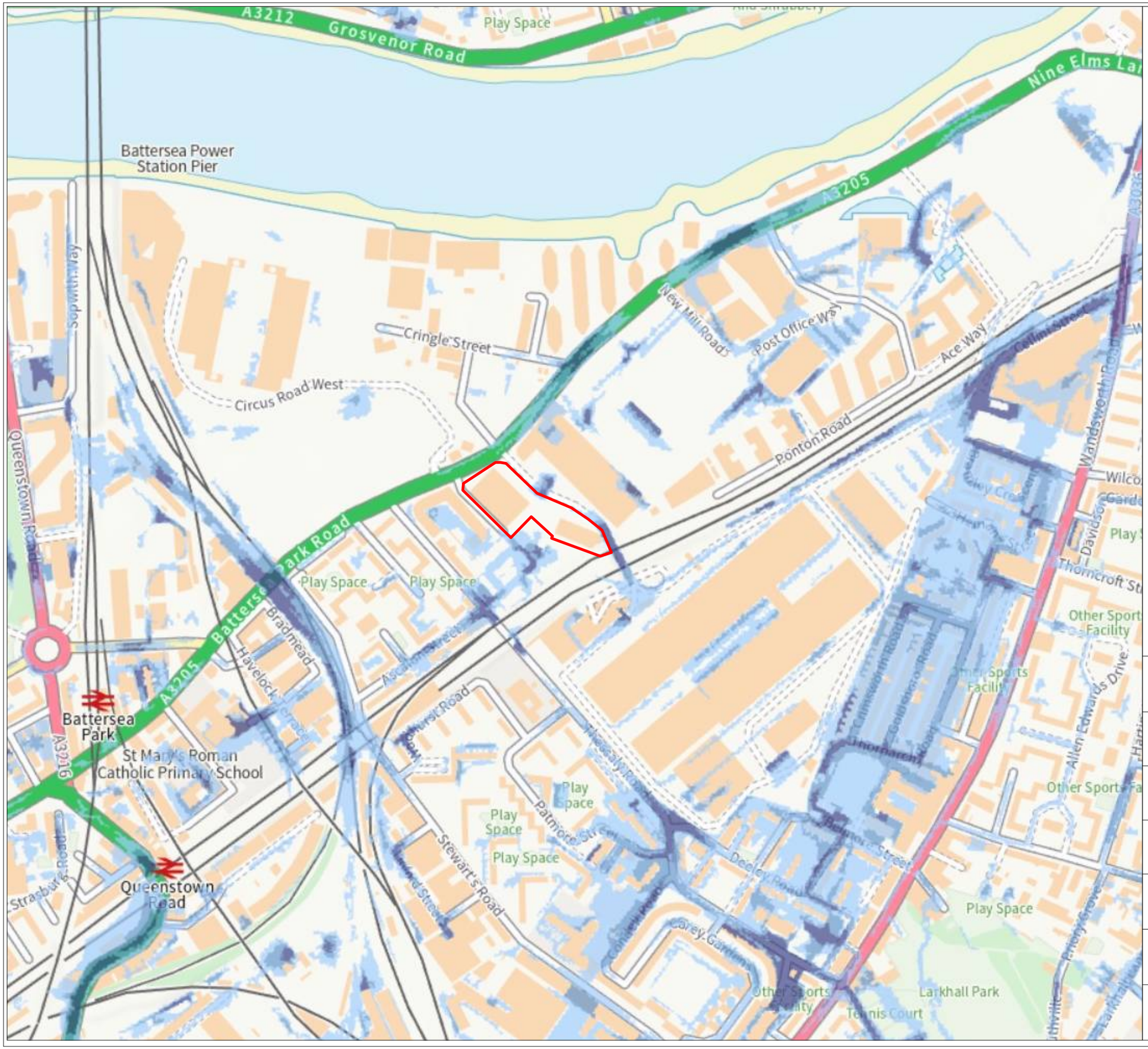


KEY

- Site Boundary
- Flood Zone 3
- Flood Zone 2
- Flood Zone 1

APEX CONSULTING ENGINEERS

PROJECT	Battersea Park Road
CLIENT	Watkin Jones Group
TITLE	Environment Agency Flood Zones
PROJECT REF	956-TSY-ZZ-XX-DR-C-002
DRAWING NO	956/FRA/002
SCALE	NTS@A3
DATE	March 2022

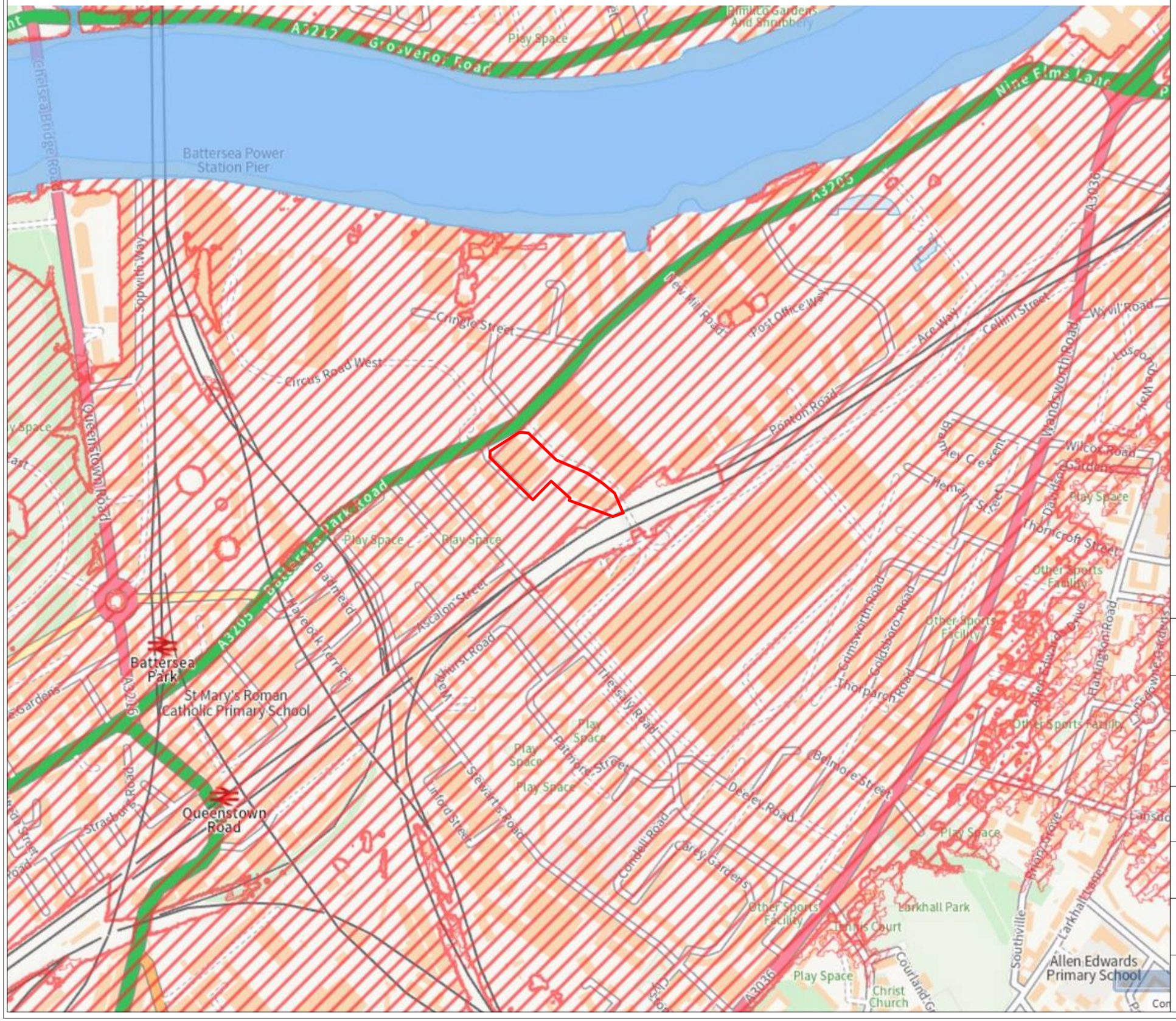


KEY

- Site Boundary
- Very Low
- Low
- Medium
- High

APEX CONSULTING ENGINEERS

PROJECT	Battersea Park Road
CLIENT	Watkin Jones Group
TITLE	Environment Agency Surface Water Flood Map
PROJECT REF	956-TSY-ZZ-XX-DR-C-002
DRAWING NO	956/FRA/003
SCALE	NTS@A3
DATE	March 2022



KEY

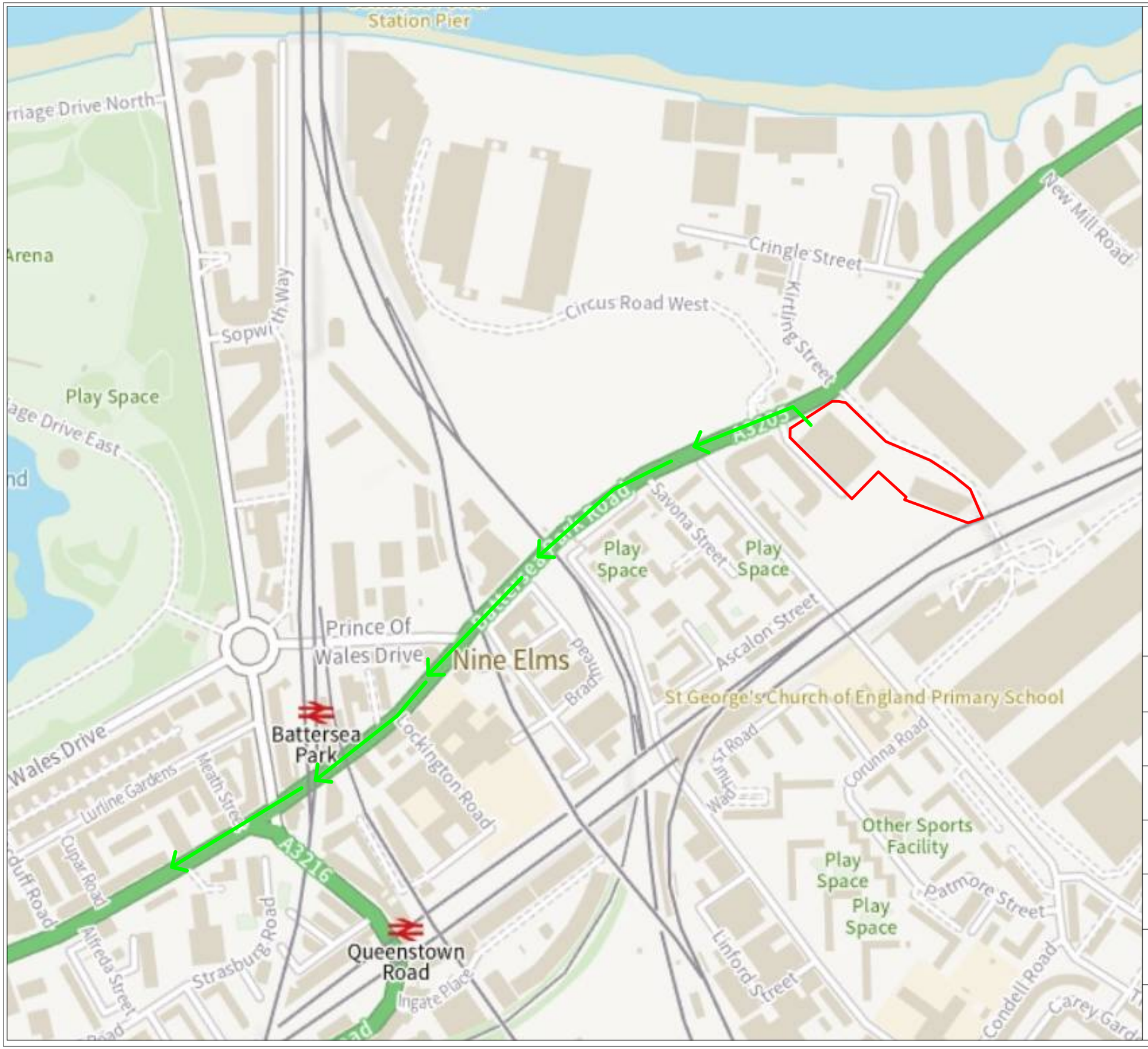
Site Boundary

When River Levels are Normal

When there is also Flooding from Rivers

APEX CONSULTING ENGINEERS

PROJECT	Battersea Park Road
CLIENT	Watkin Jones Group
TITLE	Environment Agency Reservoir Flood Map
PROJECT REF	956-TSY-ZZ-XX-DR-C-001
DRAWING NO	956/FRA/004
SCALE	NTS@A3
DATE	March 2022



KEY

Site Boundary

Safe Access and Egress Route

APEX CONSULTING ENGINEERS

PROJECT	Battersea Park Road
CLIENT	Watkin Jones Group
TITLE	Access and Egress Route
PROJECT REF	956-TSY-ZZ-XX-DR-C-001
DRAWING NO	956/FRA/005
SCALE	NTS@A3
DATE	March 2022

Appendix B – Environment Agency Data

Product 4 (Detailed Flood Risk) for: 41-49 Battersea Park Road, Nine Elms, London, SW8 5AL
Requested by: Ruth Evans / KRS
Reference: KSL 251388 RL
Date: 18 February 2022

Contents

The information provided is based on the best data available as of the date of this letter.

You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements to the data for this location have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

Please refer to the Open Government Licence which explains the permitted use of this information.

Environment Agency, Orchard House, Endeavour Park, London Road, West Malling, ME19 5SH
Customer services line: 020 8474 6848
Email: kslenquiries@environment-agency.gov.uk
Website: https://www.gov.uk/government/organisations/environment-agency

Flood Risk Assessments: Climate Change Allowances

On 20/07/2021 the ‘Flood risk assessments: climate change allowances’ were updated and published on gov.uk. You can view the updated allowances at ‘Flood risk assessments: climate change allowances’.

You will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

It remains the applicant’s responsibility to demonstrate through their proposals and flood risk assessments that a new development will be safe in flood risk terms for its lifetime.

Environment Agency, Orchard House, Endeavour Park, London Road, West Malling, ME19 5SH
Customer services line: 020 8474 6848
Email: kslenquiries@environment-agency.gov.uk
Website: https://www.gov.uk/government/organisations/environment-agency

Flood Map for Planning (Rivers and Sea)

The Flood Map:

Our Flood Map shows the natural floodplain for areas at risk from river and tidal flooding. The floodplain is specifically mapped ignoring the presence and effect of defences (including any tidal barriers). Although flood defences reduce the risk of flooding they cannot completely remove that risk as they may be over topped or breached during a flood event.

The Flood Map indicates areas with a 1% (0.5% in tidal areas), Annual Exceedance Probability (AEP) - the probability of a flood of a particular magnitude, or greater, occurring in any given year, and a 0.1% AEP of flooding from rivers and/or the sea in any given year. In addition, the map also shows the location of some flood defences and the areas that benefit from them.

The Flood Map is intended to act as a guide to indicate the potential risk of flooding. When producing it we use the best data available to us at the time and also take into account historic flooding and local knowledge. The Flood Map is updated on a quarterly basis to account for any amendments required. These amendments are then displayed on the internet at https://www.gov.uk/check-flood-risk

At this Site:

The Flood Map shows that this site lies within the outline of Flood Zone 3. This zone comprises land assessed as having a 0.5% (1 in 200) or greater annual probability of tidal flooding.

Enclosed is an extract of our Flood Map which shows this information for your area.

Method of production

The Flood Map at this location has been derived using detailed modelling of the tidal River Thames through the Thames Tidal Defences Study completed in 2006 by Halcrow Ltd.

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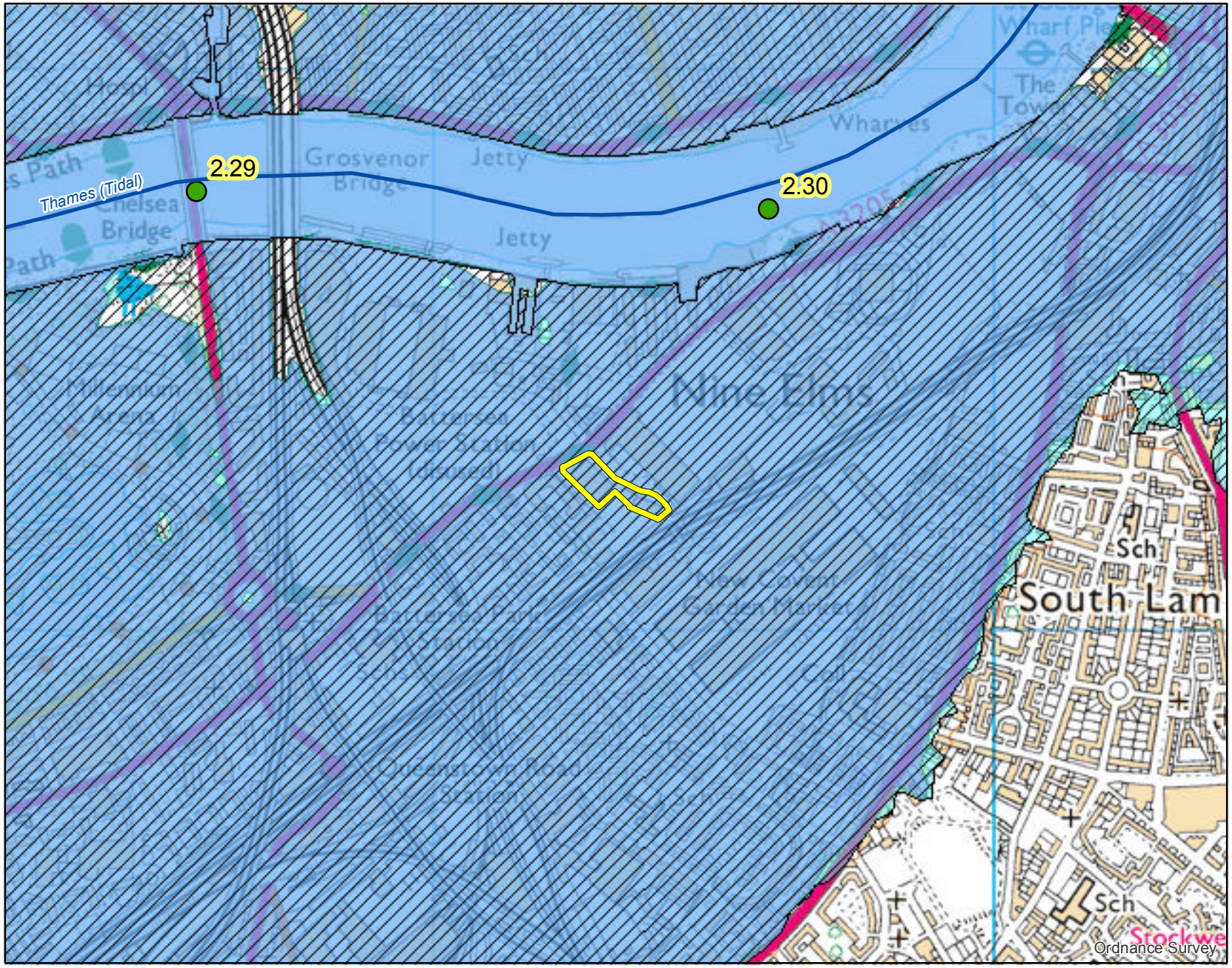
Customer services line: 020 8474 6848
Email: kslenquiries@environment-agency.gov.uk
Website: https://www.gov.uk/government/organisations/environment-agency

Detailed FRA Map centred on SW8 5AL created 21/02/2022 [Ref: KSL 251388 RL]



Environment Agency

Scale 1: 10,000

Legend

- Site
- Main Rivers
- TE2100 Model Nodes
- Flood Map - Water Storage Areas
- Areas Benefitting from Flood Defences
- Flood Map - Flood Zone 3
- Flood Map - Flood Zone 2

Flood Map for Planning (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of occurring each year
- or from a river with a 1% or greater chance of occurring each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 0.1% chance of occurring each year.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Thames Estuary 2100 (TE2100)

You have requested in-channel flood levels for the tidal river Thames. These have been taken from the Thames Estuary 2100 study completed by HR Wallingford in 2008. The modelled node closest to your site is **2.30;** the locations of nearby nodes are also shown on the enclosed map.

Details about the TE2100 plan

The Plan sets out how the Environment Agency and our partners can work together to manage tidal flood risk, from now until the end of the century. The Plan covers the Thames Estuary from Teddington in the west to the mouth of the estuary at Shoeburyness (north bank) and Sheerness (south bank) in the east. It is an adaptive plan for managing the estuary, including the tidal defence system, until 2100 so that current standards of flood protection are maintained or improved taking into account climate change effects e.g. sea level rise. The Plan has 3 phases of activity:

- Until 2035 – maintain and improve current defences, safeguard areas required for future improvements, and monitor climate change indicators.
- 2035-2050 – raise existing walls, defences & smaller barriers whilst reshaping the riverside environment.
- 2050-2100 – determine and implement an option for the future of the Thames Barrier, and adapt other defences as required to work alongside this to protect the estuary.

The Thames Estuary 2100 Plan can be found at: https://www.gov.uk/government/publications/thamesestuary-2100-te2100

Details about the TE2100 in-channel levels

The TE2100 in-channel levels take into account operation of the Thames Barrier when considering future levels. The Thames Barrier requires regular maintenance and with additional closures the opportunity for maintenance will be reduced. When this happens, river levels – for which the Barrier would normally shut for the 2008 epoch – will have to be allowed through to ensure that the barrier is not shut too often. For this reason, levels upriver of the barrier will increase and the tidal walls will need to be raised to match.

Why is there no return period for levels upriver of the barrier?

The levels upriver of the barrier are the highest levels permitted by the operation of the Thames Barrier. If levels and flows are forecast to be any higher, the Thames Barrier would shut, ensuring that the tide is blocked and the river maintained to a low level. For this reason the probability of any given water level upriver of the Barrier is controlled and therefore any associated return period becomes irrelevant. The Thames Barrier and associated defence system has a 1 in 1000 year standard which means it ensures that flood risk is managed up to an event that has a 0.1% annual probability. The probability of water levels upriver is ultimately controlled by the staff at the Thames Barrier.

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Why are the levels in west London higher than the defence crest levels?

In west London there is a heavy influence from upriver flows (fluvial flows). The flood defences are built to manage tidal flood risk only. With very high fluvial flows, the river levels in west London could be above the 0.1% annual probability tidal level.

Why are the climate change/future west London levels lower than the 2008 levels?

The climate change levels are assessed to determine the future tidal defence levels. For this reason they only account for extreme tidal events and not extreme fluvial flow events. The 2008 levels include extreme flows from upriver (fluvial events) as well as extreme tidal events.

For further information about the Thames Barrier please visit our website at:

https://www.gov.uk/the-thames-barrier

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TE2100 2008 levels:

Levels downriver of the Thames Barrier are 0.1% AEP (1 in 1000) and levels upriver are the highest levels permitted by the Thames Barrier, described as the Maximum Likely Water Levels (MLWLs). The defence levels (left defence, right defence) are the minimum levels to which the defences should be built.

Location	Node	Easting	Northing	Extreme water level (m)	Left defence (m)	Right defence (m)	Allow for future defence raising to a level of...	
							Left Bank (m)	Right Bank (m)
	2.28	527631	177547	4.87	5.41	5.41	6.35	6.35
	2.29	528578	177781	4.87	5.41	5.41	6.35	6.35
	2.30	529598	177749	4.86	5.41	5.41	6.35	6.35
	2.31	530333	178388	4.85	5.41	5.41	6.35	6.35
Westminster	2.32	530481	179473	4.84	5.41	5.41	6.35	6.35

TE2100 climate change levels:

				2065 to 2100		**2100**	
Location	Node	Easting	Northing	Design water level	Defence level (both banks)	Design water level	Defence level (both banks)
	2.28	527631	177547	5.37	5.85	5.82	6.35
	2.29	528578	177781	5.36	5.85	5.82	6.35
	2.30	529598	177749	5.35	5.85	5.81	6.35
	2.31	530333	178388	5.34	5.85	5.80	6.35
Westminster	2.32	530481	179473	5.33	5.85	5.79	6.35

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Thames Tidal Upriver Breach Inundation Modelling - 2017

The table below displays site-specific modelled flood levels at your site. These have been taken from the Thames Tidal Upriver Breach Inundation Modelling Study 2017 completed by Atkins Ltd. in May 2017.

We have developed a modelling approach where all upriver breach locations along the Thames are equitably modelled, to ensure a consistent approach across London. This modelling simulates 5679 continuous tidal breaches along the entire extent of the Thames from Teddington to the Thames Barrier. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scour distance was assumed to extend into the floodplain by the same distance as the breach width.

For breaches upriver of the Thames Barrier, there is no return period for modelled levels as the levels are controlled by barrier closures. The levels used are referred to as Maximum Likely Water Levels (MLWLs). Therefore 2014 and 2100 epochs were modelled on that basis.

This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within London.

	National Grid Reference		Modelled levels in mAODN for Max Likely Water Level	
Node	**Easting**	**Northing**	**2014**	**2100**
1	529277	177310	4.49	4.91
2	529237	177285	Nil Return	4.60
3	529297	177280	4.25	4.71
4	529262	177275	4.25	4.71
5	529332	177255	4.39	4.72
6	529292	177250	4.25	4.71
7	529362	177240	4.33	4.61
8	529297	177225	4.03	4.44
9	529372	177215	4.22	4.60
10	529417	177215	4.34	4.60

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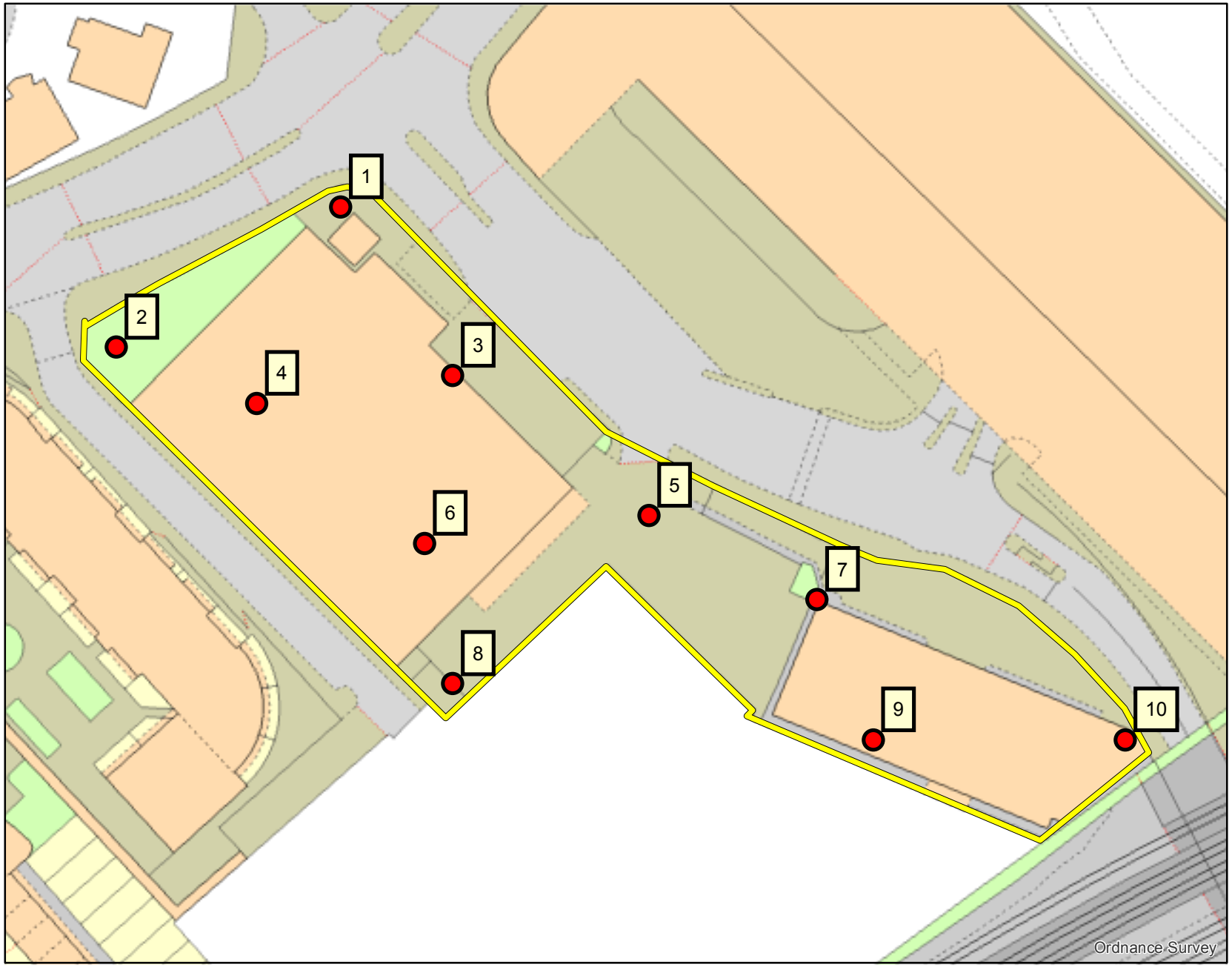
2D Node Location Map centred on SW8 5AL created 21/02/2022 [Ref: KSL 251388 RL]



Environment Agency

Scale 1: 1,000

N
W
E
S

Legend

- 2D Nodes
- Site

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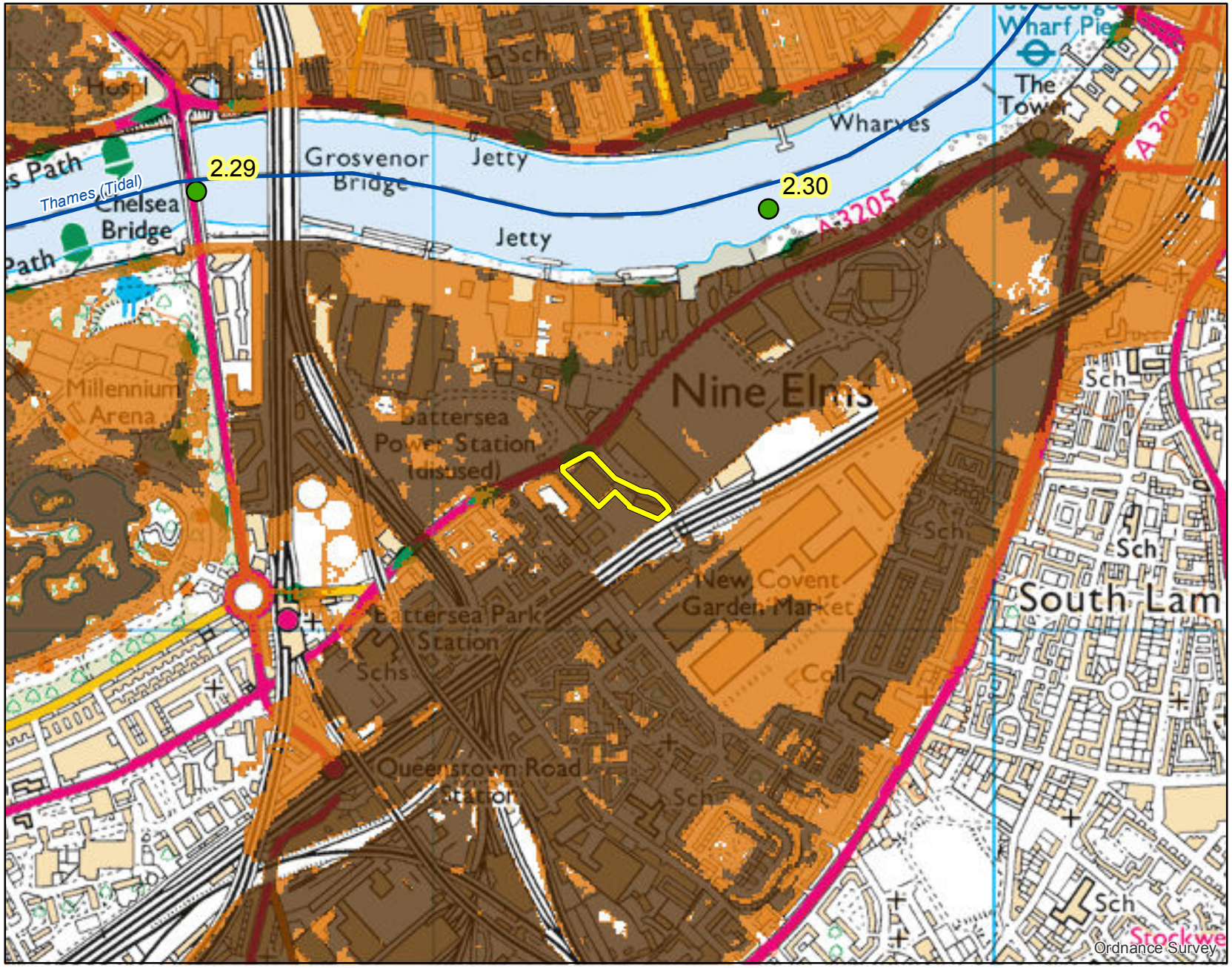
Breach Inundation Modelling Map centred on SW8 5AL created 21/02/2022 [Ref: KSL 251388 RL]



Environment Agency

Scale 1: 10,000

Legend

- Site
- Main Rivers
- TE2100 Model Nodes

Upriver MLWL Breach Inundation

Epoch

- 2014
- 2100

Thames Tidal Upriver Breach Inundation Modelling 2017

A modelled representation of all upriver tidal breach locations along the Thames from Teddington to the Thames Barrier, based on low floodplain topography. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scour distance was assumed to extend into the floodplain by the same distance as the breach width.
The modelling is based on the 2008 TE2100 in-channel levels, with an allowance for climate change for epoch 2100.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Defence Details

The design standard of protection of the flood defences in this area of the Thames is 0.1% AEP; they are designed to defend London up to a 1 in 1000 year **tidal** flood event. The defences are all raised, man-made and privately owned. It is the riparian owners' responsibility to ensure that they are maintained to a crest level of **5.41** m AODN (the Statutory Flood Defence Level in this reach of the Thames).

For more information on your rights and responsibilities as a riparian owner, please see our document 'Living on the edge' found on our website at:

https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities

Areas Benefiting from Flood Defences

This site is within an area benefiting from flood defences, as shown on the enclosed extract of our Flood Map. Areas benefiting from flood defences are defined as those areas which benefit from formal flood defences specifically in the event of flooding from rivers with a 1% (1 in 100) chance in any given year, or flooding from the sea with a 0.5% (1 in 200) chance in any given year.

If the defences were not there, these areas would be flooded. An area of land may benefit from the presence of a flood defence even if the defence has overtopped, if the presence of the defence means that the flood water does not extend as far as it would if the defence were not there.

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Recorded Flood Events Data

We hold records of historic flood events from rivers and the sea. Information on the floods that may have affected the area local to your site is provided below and in the enclosed map (if relevant).

Flood Event Data

1928 – The site was within approximately **355m** of the tidal flooding on the night of the 6th and morning of the 7th January. There was overtopping in the area during a storm surge (which coincided with high fresh water flows). An approximate level in the Thames at the time was **5.17** m AODN.

Due to the fact that our records are not comprehensive, we would advise that you make further enquiries locally with specific reference to flooding at this location. You should consider contacting the relevant Local Planning Authority and/or water/sewerage undertaker for the area.

We map flooding to land, not individual properties. Our historic flood event record outlines are an indication of the geographical extent of an observed flood event. Our historic flood event outlines do not give any indication of flood levels for individual properties. They also do not imply that any property within the outline has flooded internally.

Please be aware that flooding can come from different sources. Examples of these are:

- from rivers or the sea;
- surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system);
- overflowing or backing up of sewer or drainage systems which have been overwhelmed,
- groundwater rising up from underground aquifers

Currently the Environment Agency can only supply flood risk data relating to the chance of flooding from rivers or the sea. However you should be aware that in recent years, there has been an increase in flood damage caused by surface water flooding and drainage systems that have been overwhelmed.

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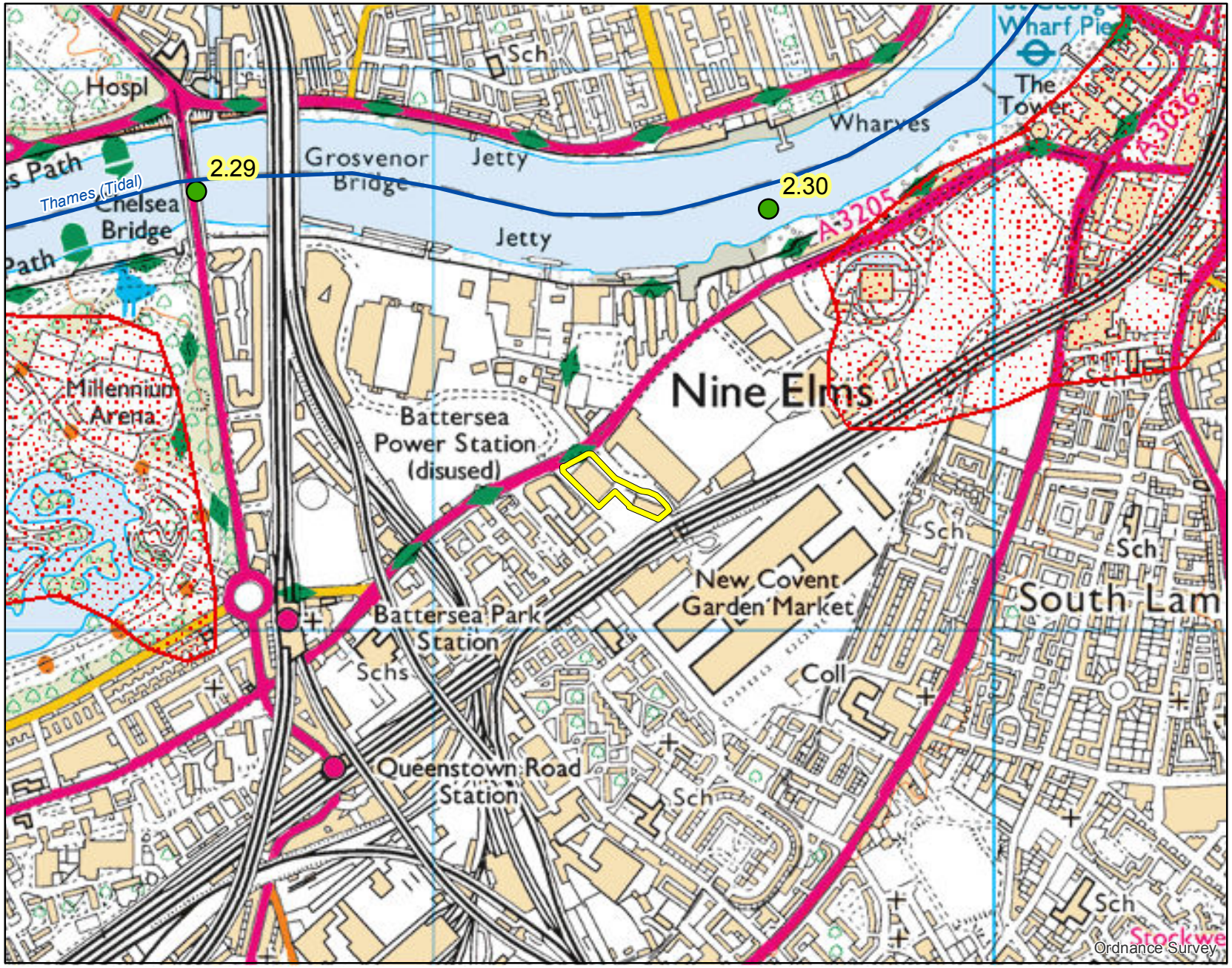
Historic Flood Extents Map centred on SW8 5AL created 21/02/2022 [Ref: KSL 251388 RL]



Environment Agency

Scale 1: 10,000

N W E S

Legend

- Site
- Main Rivers
- TE2100 Model Nodes
- Jan 1928 Flood Outline

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Additional Information

Information Warning - OS background mapping

The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply to this background mapping. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial purposes for the period during which the Environment Agency makes it available. You are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS.

Planning advice and guidance

The Environment Agency are keen to work with partners to enable development which is resilient to flooding for its lifetime and provides wider benefits to communities. If you have requested this information to help inform a development proposal, then we recommend engaging with us as early as possible by using the pre-application form available from our website:
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Complete the form in the link and email back to kslplanning@environment-agency.gov.uk

We recognise the value of early engagement in development planning decisions. This allows complex issues to be discussed, innovative solutions to be developed that both enables new development and protects existing communities. Such engagement can often avoid delays in the planning process following planning application submission, by reaching agreements up-front. We offer a charged pre-application advice service for applicants who wish to discuss a development proposal.
We can also provide a preliminary opinion for free which will identify environmental constraints related to our responsibilities including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

Environment Agency, Orchard House, Endeavour Park, London Road, West Malling, ME19 5SH
Customer services line: 020 8474 6848
Email: kslenquiries@environment-agency.gov.uk
Website: https://www.gov.uk/government/organisations/environment-agency

Flood Risk Assessments guidance

Flood risk standing advice for applicants

In preparing your planning application submission, you should refer to the Environment Agency's Flood Risk Standing Advice and the Planning Practice Guidance for information about what flood risk assessment is needed for new development in the different Flood Zones. This information can be accessed via:

https://www.gov.uk/flood-risk-assessment-standing-advice

http://planningguidance.planningportal.gov.uk/

https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications

https://www.gov.uk/guidance/flood-risk-and-coastal-change

You should also consult the Strategic Flood Risk Assessment and flood risk local plan policies produced by your local planning authority.

You should note that:

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk Assessment where one is required, but does not constitute such an assessment on its own.
2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or overland runoff. You should discuss surface water management with your Lead Local Flood Authority.
3. Where a planning application requires a FRA and this is not submitted or deficient, the Environment Agency may well raise an objection due to insufficient information

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Surface Water

We have provided two national Surface Water maps, under our Strategic Overview for flooding, to your Lead Local Flood Authority who are responsible for local flood risk (i.e. surface runoff, ground water and ordinary watercourse), which alongside their existing local information will help them in determining what best represents surface water flood risk in your area.

Your Lead Local Flood Authority have reviewed these and determined what it believes best represents surface water flood risk. You should therefore contact this authority so they can provide you with the most up to date information about surface water flood risk in your area.

You may also wish to consider contacting the appropriate relevant Local Planning Authority and/or water/sewerage undertaker for the area. They may be able to provide some knowledge on the risk of flooding from other sources. We are working with these organisations to improve knowledge and understanding of surface water flooding.

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Customer services line: 020 8474 6848
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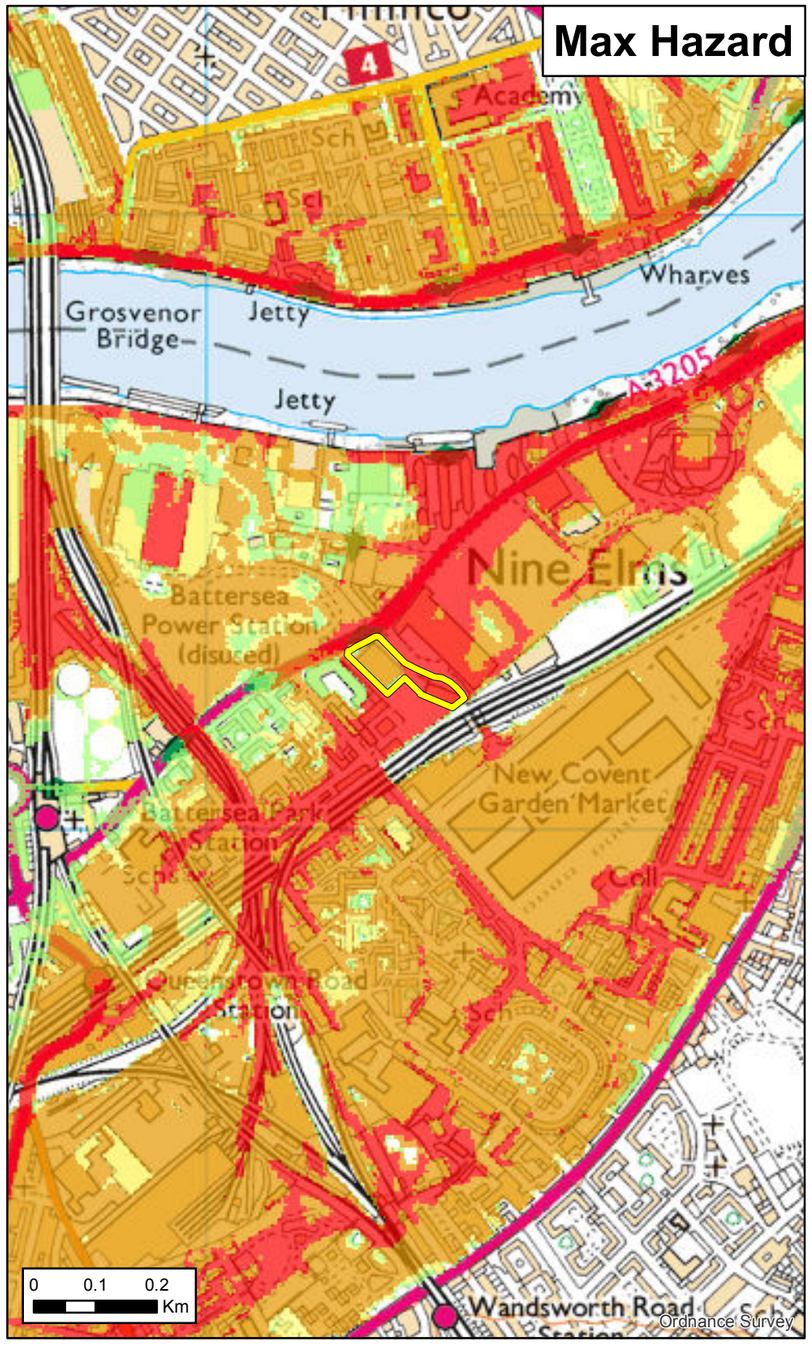
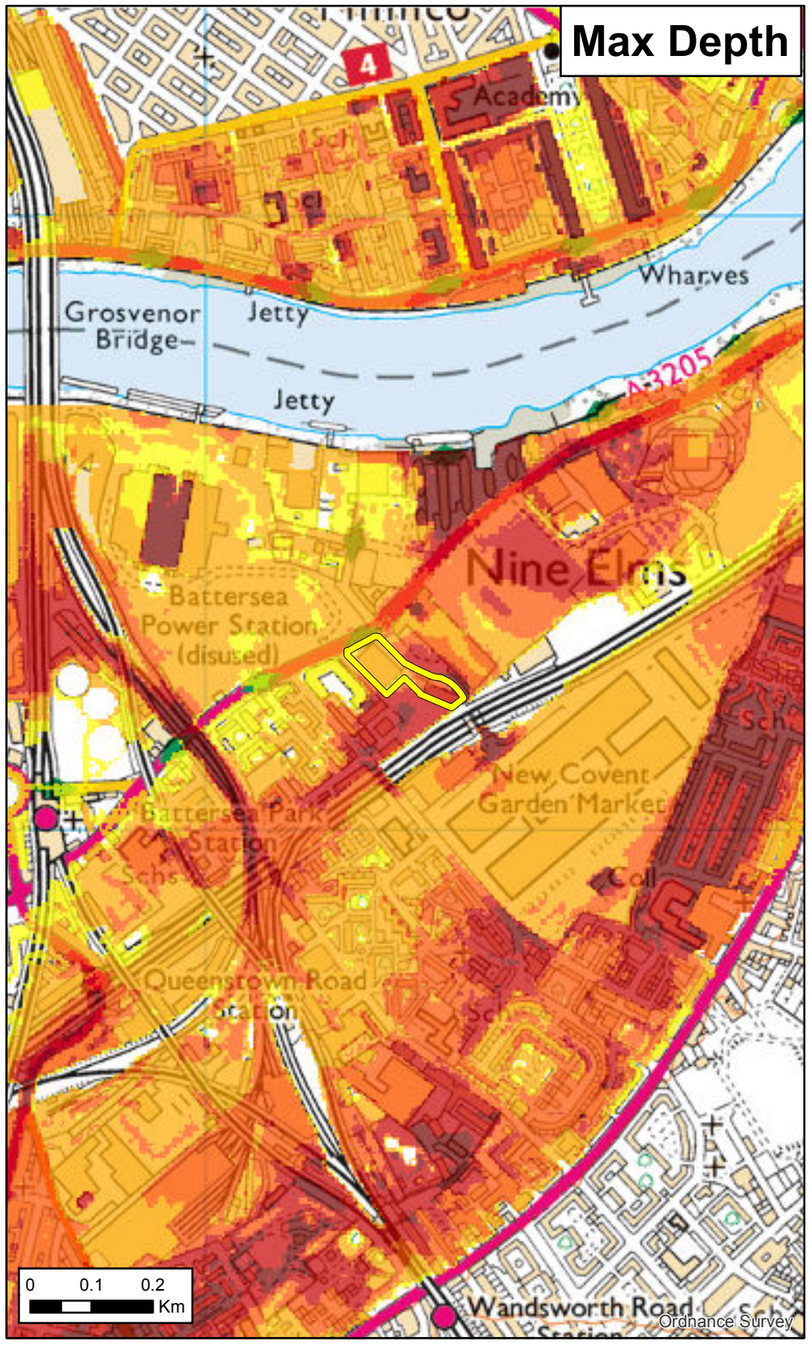
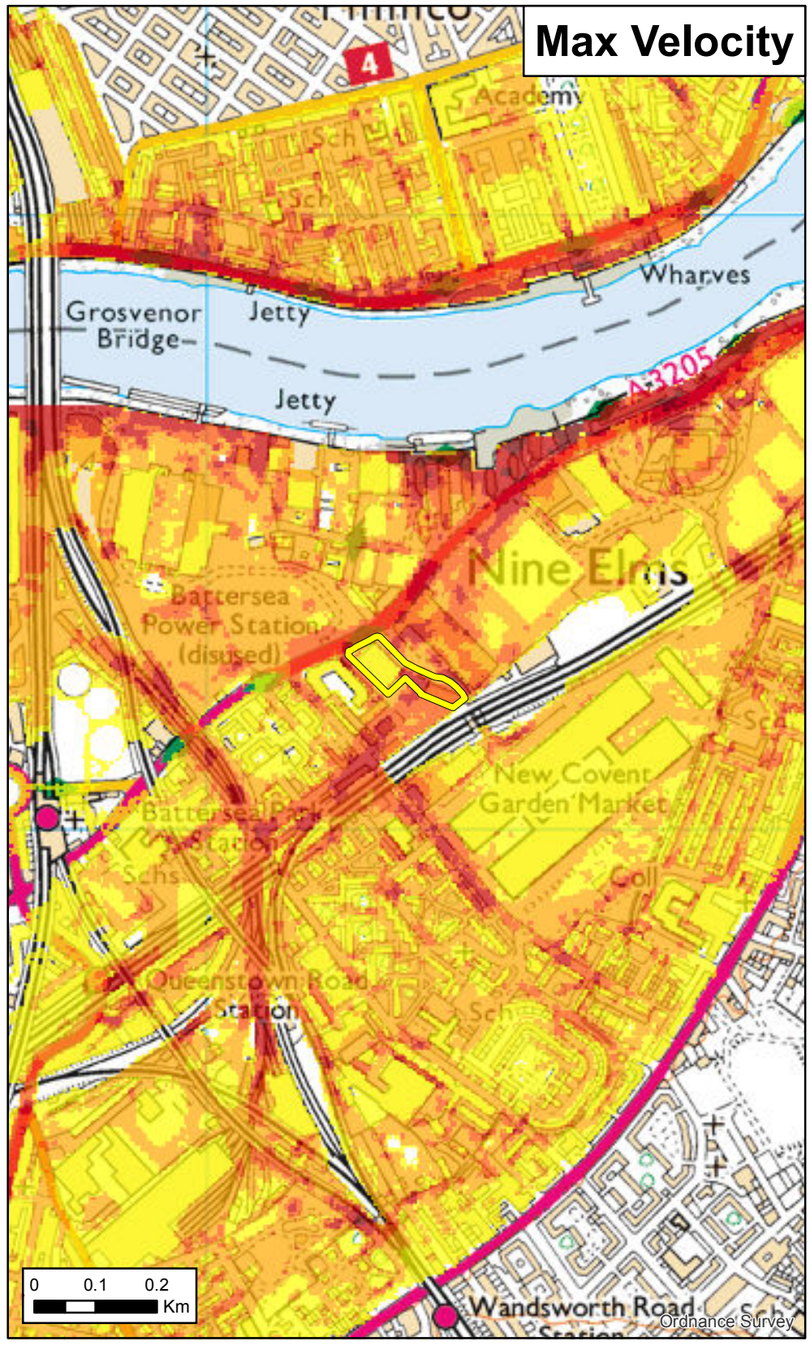
Website: https://www.gov.uk/government/organisations/environment-agency







Site

Max Hazard

- Less than 0.75 (Low Hazard)
- Between 0.75 and 1.25 (Danger for Some)
- Between 1.25 and 2.00 (Danger for Most)
- Greater than 2.00 (Danger for All)

Max Depth (m)

- 0 - 0.25
- 0.25 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- > 2.00

Max Velocity (m/s)

- 0 - 0.3
- 0.3 - 1.0
- 1.0 - 1.5
- 1.5 - 2.5
- > 2.5

Date Printed	21/02/2022	Scenario year	2100	Scenario Annual Chance	MLWL

This map shows the combined flood hazard to people (called a hazard rating) if our flood defences are breached at any given single location, for a range of scenarios. The hazard rating depends on the depth and velocity of floodwater, and maximum values of these are also mapped.

The map is based on computer modelling of simulated breaches covering the entire extent between Teddington Weir and the Thames Barrier. Each breach has been modelled individually and the results combined to create this map. Multiple breaches, other combinations of breaches, different sized tidal surges or flood flows may all give different results.

The map only considers the consequences of a breach, it does not make any assumption about the likelihood of a breach occurring. The likelihood of a breach occurring will depend on a number of different factors, including the construction and condition of the defences in the area. A breach is less likely where defences are of a good standard, but a risk of breaching remains.

Please contact the Environment Agency for further information on emergency planning associated with flood risk in this area.

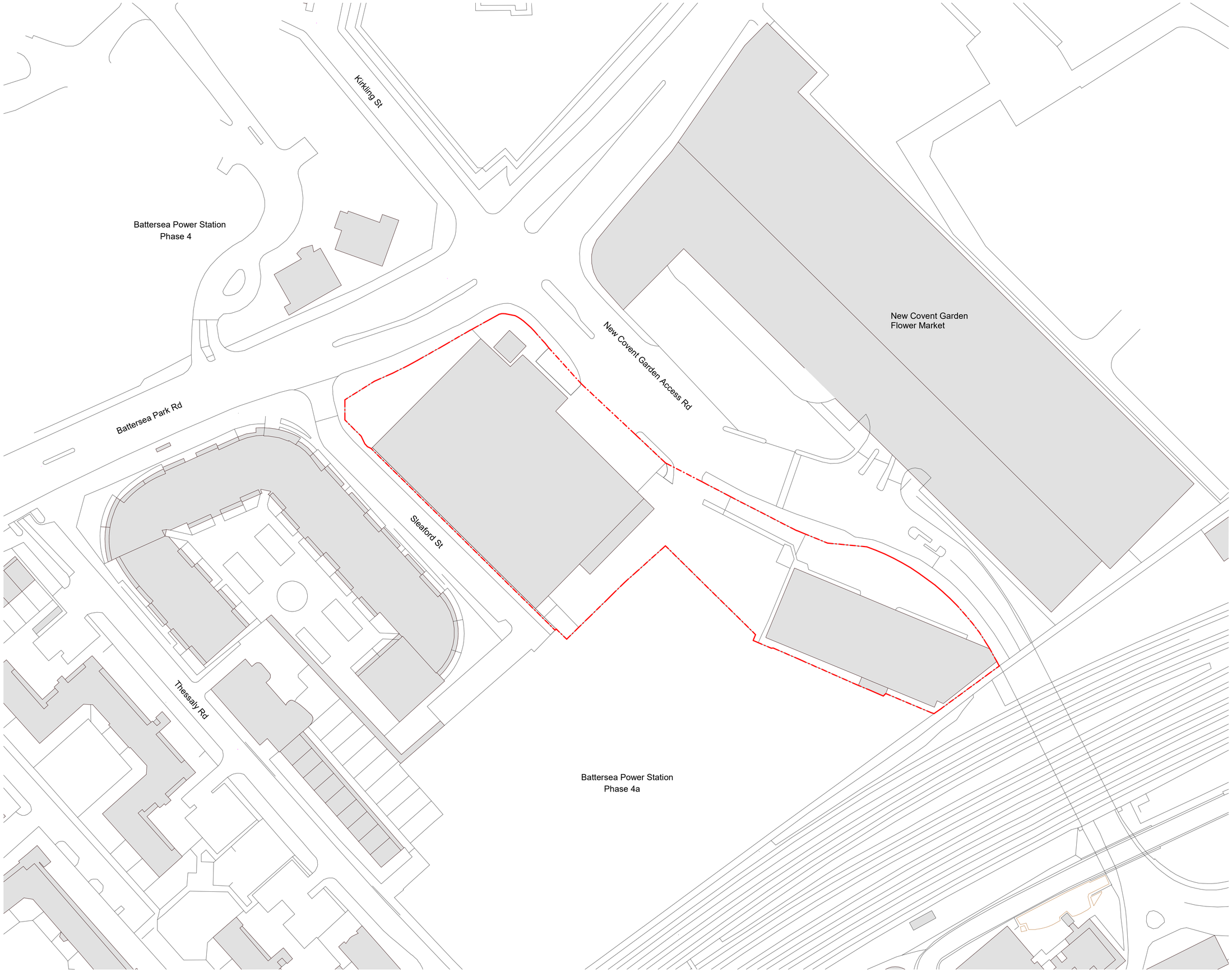
General Enquiries No: 03708 506 506. Weekday Daytime calls cost 5p plus up to 6p per minute from BT Weekend Unlimited. Mobile and other providers' charges may vary

Environment Agency

Thames Tidal Breach Hazard Mapping

Map Centred on SW8 5AL
KSL 251388 RL

Appendix C – Existing Site Layout



Notes & Key

DIMENSIONS NOT TO BE SCALED FROM THIS DRAWING. CONTRACTORS TO NOTIFY ARCHITECTS OF SITE VARIATIONS AFFECTING INFORMATION ON THIS DRAWING. THIS DRAWING IS COPYRIGHT OF GLENN HOWELLS ARCHITECTS.

This drawing has been produced without the use of a measured survey. Glenn Howells Architects cannot guarantee the accuracy of the information generated regarding its relationship to the site or surrounding area.

The red line boundary contained within this drawing should be treated as indicative.

Indicative Site Boundary

Indicative Site Area - 8097m²

Revisions

Date	Rev	By	Description
18.01.2021	P01	SJ	Information Issue

Location Key

Information

Project	GHA No.
Battersea Park Road	2278

Client

Watkin Jones

Drawing Title

Existing Site Plan

Drawing No.	Revision
2278-GHA-ZZ-00-DR-A-(10)010	**P01**

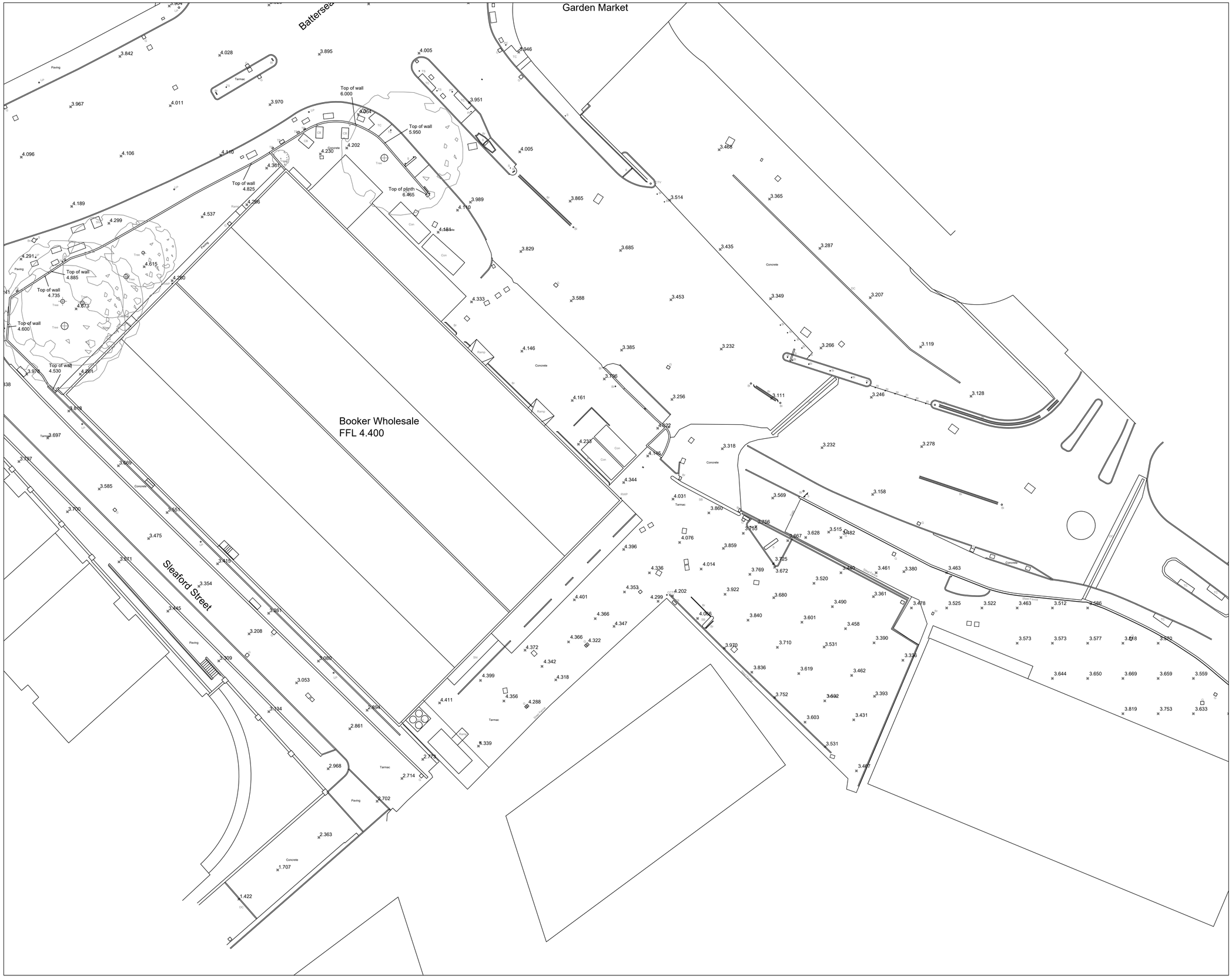
Scale	Date	Checked
Scale - 1 : 500@A1	18.01.21	MF

Glenn Howells Architects

Birmingham London glennhowells.co.uk

Appendix D – Proposed Site Layout

Appendix E – Topographical Survey



Notes:

Drawing provided for information only, all measurements to be checked on site prior to construction

Site Surveyed 28-09-21

Key:

Bl - Bollard
Bn - Bin
Br - Barrier
Bsh - Bus Shelter
Bst - Bus Stop
CB - Concrete Block
Con - Container
G - Road Gully
PC - Pedestrian Crossing
PL - Planters
RWP - Rain Water Pipe
S - Sign
SB - Speed Bump
Shl - Shelter
TB - Telecoms/Electric Box
TC - Tactile Paving
TS - Traffic Signal

Rev.		Date	By
A	First issue	10-10-21	AC
B	Additional spot levels added	12-10-21	AC

C-SE Survey & Engineering
Andrew@c-se.co.uk
077085 36503

Drawing Title: Topo Survey

Site: Booker Wholesale, Battersea

Scale: 250:1@A1

Drawing No.: AC119 - 001

Rev.B

Drawn By: A.C.

Date: 12-10-21


APEX CONSULTING
ENGINEERS